

APPENDIX A

Silvicultural and Fuel Treatments

Table 1 displays a detailed list of the silvicultural and fuel treatments that are proposed for each stand, or portion of a stand in the project area, by the Alternative. Many stands would have more than one type of treatment, so are broken out in the more than one unit. A map that coincides with this table can be viewed on the project website at <http://www.fs.fed.us/r6/centraloregon/index-metolius>, or can be requested from the Sisters Ranger District.

hp = handpile, m=mow, mp = machine pile, ub= underburn

Table 1. Detailed list of silvicultural and fuel treatment by stand by Alternative

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
1	4.26	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
2	11.38	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
3	7.59	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
4	1.02	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
4	13.62	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
5	23.92	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
6	1.74	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
6	7.37	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
7	11.72	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
8	5.84	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
8	22.69	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
9	8.32	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
9	21.82	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
10	4.82	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
11	13.18	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
12	5.67	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
12	6.52	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
13	3.78	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
14	9.97	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
15	7.17	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
16	2.77	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
16	24.41	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
17	1.46	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
17	8.86	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
17	15.31	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
18	2.33	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
19	1.45	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
11095	6.68	no treatment	no treatment	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
11095	9.87	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
11096	4.85	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile
11096	29.07	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
11098	6.65	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
11588	3.63	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
11590	5.92	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
11590	99.82	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
11591	11.47	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
11591	45.35	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
11596	2.06	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
11596	14.45	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
11596	79.98	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
11597	3.29	underburn	M	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh	underburn/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
11597	5.10	underburn	M	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh	underburn/mow
11598	22.18	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
11599	5.94	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh	underburn/mow
11599	6.99	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh	underburn/mow
11600	1.63	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
11600	10.05	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57014	3.76	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57014	43.30	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57015	12.16	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57025	4.77	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57026	52.80	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57027	30.84	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57028	24.49	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57029	56.23	underburn		underburn		underburn		underburn	
57030	38.57	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57031	10.81	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57033	4.53	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57034	11.92	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57034	16.78	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57035	45.72	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57036	7.32	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57036	9.66	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57036	14.11	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood/thin > 12" dbh	machine pile
57040	1.77	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57040	10.29	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57058	3.59	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57058	3.97	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57058	9.96	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57058	20.77	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57058	41.82	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57148	1.90	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57148	19.34	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57507	1.10	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57507	2.22	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
57507	6.42	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57508	3.37	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57509	1.36	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
57509	6.20	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57513	5.23	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57514	1.26	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57514	1.39	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57514	29.71	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57515	25.49	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57515	29.22	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57516	9.69	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57517	11.08	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57518	17.58	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57522	8.65	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57523	14.21	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57524	5.53	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57524	60.65	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57525	36.36	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57526	27.05	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
57527	30.34	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57527	113.28	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57528	31.89	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57529	31.81	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57530	12.35	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57531	18.29	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57532	38.35	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57533	1.27	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
57533	1.47	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
57533	11.06	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57533	90.45	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57534	4.21	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57534	8.33	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57534	9.31	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile
57534	18.46	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
57535	1.36	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57535	6.10	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57535	6.33	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile
57535	50.82	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57537	2.29	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57537	4.35	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57537	11.89	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57538	1.22	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57538	2.25	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57538	5.99	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	shelterwood	underburn/hand pile
57539	5.34	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57539	6.01	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57540	3.47	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57540	4.21	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57541	5.18	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57541	6.41	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57542	1.23	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57542	1.61	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57542	1.88	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57542	8.74	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57543	3.62	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57543	6.61	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57543	8.19	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57543	12.30	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57543	22.14	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile
57546	3.06	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57546	4.14	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57546	25.81	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
57547	4.24	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57547	5.75	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57547	8.63	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile
57547	22.32	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57548	1.88	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57548	2.30	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57548	2.67	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57549	2.37	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	laspen restorationch restoration	underburn/hand pile
57549	4.89	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57549	15.73	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	laspen restorationch restoration	underburn/hand pile
57550	3.07	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
57550	8.69	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57550	16.43	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
57551	9.64	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	underburn/hand pile
57551	17.14	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	shelterwood	underburn/hand pile
57553	2.19	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57553	3.06	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57553	8.94	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57554	3.64	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57554	8.45	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57554	10.62	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57554	27.25	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57555	1.42	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57555	10.81	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57556	8.51	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57556	16.66	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57558	6.81	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57558	8.36	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57559	1.32	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57559	3.60	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57559	10.38	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57560	5.80	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57560	8.75	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57561	1.49	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57561	2.09	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57561	37.24	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57562	1.20	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57565	19.12	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57565	26.06	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57565	66.72	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
57566	5.41	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57566	36.18	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57568	1.33	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57569	3.62	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57569	14.85	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57570	1.07	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57570	2.39	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57570	4.14	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57575	1.92	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57575	16.35	underburn	M	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
57575	44.86	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
57576	22.85	underburn	M	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
57576	36.11	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
57577	3.07	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
57577	82.22	underburn	M	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
57615	6.55	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
57615	11.39	no treatment	no treatment	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
57616	15.13	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57617	2.92	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57617	5.99	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57617	23.00	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57618	16.42	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
57619	1.17	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57619	6.83	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57619	11.00	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57620	2.03	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood	machine pile
57620	11.23	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57621	3.53	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57621	11.01	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57628	2.51	underburn		underburn		underburn		underburn	
57628	63.81	underburn		no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57953	19.03	underburn	M	underburn	M	underburn	M	underburn	M
57953	20.66	underburn	M	underburn	M	underburn	M	underburn	M
57954	5.30	underburn	M	underburn	M	underburn	M	underburn	M
57954	40.69	underburn	M	underburn	M	underburn	M	underburn	M
57955	2.85	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57955	18.40	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
57956	10.09	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57958	5.33	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57958	12.19	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57958	24.32	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57959	1.51	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57959	11.28	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57959	20.62	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57959	62.50	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57960	13.36	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57961	2.31	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57961	5.86	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57962	8.40	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57962	10.56	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57963	4.02	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57963	13.70	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57964	5.35	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57964	6.95	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57964	37.80	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57965	23.95	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57966	2.08	underburn		thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57966	9.04	underburn		thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57967	2.42	underburn		thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57967	7.83	underburn		thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57968	1.91	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57968	2.60	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57968	53.68	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57969	24.43	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57969	100.55	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57970	106.51	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57971	72.65	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57972	69.06	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57973	13.83	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57973	73.60	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57974	61.93	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	laspen restorationch restoration	machine pile/underburn/mow
57975	1.34	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
57975	189.77	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
57976	8.35	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57976	27.99	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57977	8.55	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57977	20.90	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
57978	15.93	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57978	39.92	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57979	8.63	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57979	16.93	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57980	16.03	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57980	17.43	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57981	1.28	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57981	2.82	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57981	3.33	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57981	37.51	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood/thin > 12" dbh	machine pile
57982	5.79	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57982	20.05	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57983	5.23	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57983	12.97	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	laspen restorationch restoration	machine pile/underburn
57984	18.19	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57984	40.08	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57985	1.26	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57985	8.45	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch	hand pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
								restoration	
57985	15.41	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	laspen restorationch restoration	machine pile/underburn
57986	3.89	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	shelterwood/thin > 12" dbh	machine pile
57986	17.93	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57986	40.60	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood/thin > 12" dbh	machine pile
57987	3.70	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57987	22.17	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	laspen restorationch restoration	machine pile/underburn/mow
57987	29.04	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	laspen restorationch restoration	underburn/hand pile/mow
57988	31.34	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57989	1.70	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile
57989	2.73	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
57989	10.71	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57989	15.52	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57990	1.65	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57990	19.76	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57991	3.98	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57991	14.92	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
57992	2.98	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57992	4.42	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57992	23.00	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	laspen restorationch restoration	underburn/hand pile/mow
57993	3.82	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
57993	16.39	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
57993	24.83	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57994	5.70	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile	thin up to 8" dbh in defensible space	underburn/hand pile
57994	6.34	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57994	20.84	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57995	8.37	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57995	25.45	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	laspen restorationch restoration	underburn/hand pile
57995	28.73	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	laspen restorationch restoration	underburn/hand pile
57996	9.28	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
57996	15.48	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	laspen restorationch restoration	underburn/hand pile
57997	4.87	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57997	17.85	underburn		thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
57998	2.35	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57998	5.43	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
57998	12.54	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
57998	12.82	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
57999	4.01	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
57999	14.90	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58000	5.38	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58000	31.64	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58001	13.49	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58001	14.82	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58003	18.01	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58004	2.84	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58004	26.36	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	laspen restorationch restoration	machine pile/underburn
58004	34.31	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	laspen restorationch restoration	machine pile/underburn
58005	4.42	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58005	6.31	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58005	15.69	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58006	1.16	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58006	5.99	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58007	1.26	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58007	5.30	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile
58007	12.03	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58008	5.28	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58008	5.88	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58008	7.86	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58009	11.42	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58014	4.28	thin up to 12" dbh	hand pile	underburn		underburn		underburn	
58014	31.92	underburn		underburn		underburn		underburn	
58015	3.67	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58015	5.08	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58015	6.78	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58015	9.90	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58015	14.06	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile
58015	26.54	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile
58016	1.37	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58016	2.44	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58016	12.93	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58017	20.07	aspen restoration	machine pile	aspen restoration	machine pile	aspen restoration	machine pile	aspen restoration	machine pile
58017	23.71	aspen restoration	hand pile	aspen restoration	hand pile	aspen restoration	hand pile	aspen restoration	hand pile
58019	15.43	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58020	3.54	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58020	108.26	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58021	1.26	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58021	2.95	underburn		thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58021	33.64	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58022	2.66	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58022	6.22	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58023	9.98	aspen restoration	hand pile	aspen restoration	hand pile	aspen restoration	hand pile	aspen restoration	hand pile
58023	24.23	aspen restoration	machine pile	aspen restoration	machine pile	aspen restoration	machine pile	aspen restoration	machine pile
58024	3.96	underburn		underburn		underburn		underburn	
58024	92.51	underburn	M	underburn	M	underburn	M	underburn	M
58024	136.13	underburn	M	underburn	M	underburn	M	underburn	M
58025	1.65	underburn		thin > 12" dbh in connectivity corridor	hand pile	thin > 12" dbh in connectivity corridor	hand pile	thin > 12" dbh	hand pile
58025	16.38	underburn	M	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
58025	30.94	underburn	M	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58025	44.18	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58026	3.75	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58026	3.91	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58026	8.95	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58026	10.83	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58026	11.64	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58026	12.21	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58026	14.98	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58027	4.36	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58027	5.46	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58027	16.01	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
			pile/mow		pile/mow		pile/mow		pile/mow
58043	2.89	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
58046	10.00	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58357	2.41	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58357	4.29	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58357	6.32	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58357	55.40	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58360	6.00	underburn	M	underburn	M	underburn	M	underburn	M
58360	15.12	underburn	M	underburn	M	underburn	M	underburn	M
58361	4.09	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58362	17.91	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58362	30.74	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58363	5.24	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58363	8.83	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58364	6.63	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58367	1.00	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58367	12.91	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58368	3.02	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58369	20.52	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58370	3.07	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58370	8.99	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58371	6.61	underburn		thin > 12" dbh	underburn	thin > 12" dbh	underburn	thin > 12" dbh	underburn
58371	9.46	underburn		thin > 12" dbh	underburn	thin > 12" dbh	underburn	thin > 12" dbh	underburn
58372	4.53	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58372	10.12	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58372	13.36	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58372	22.64	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58373	8.96	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58374	6.61	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58374	58.87	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58375	8.73	underburn	M	underburn	M	underburn	M	underburn	M
58375	18.53	underburn	M	underburn	M	underburn	M	underburn	M
58377	22.21	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58378	2.68	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58378	46.91	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58379	24.74	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58379	93.97	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58380	1.90	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58380	4.12	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58380	6.47	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58380	55.38	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58381	1.90	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58381	2.31	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58381	6.56	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58381	9.10	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58381	78.70	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58381	82.47	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58382	2.59	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58382	7.35	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58382	13.15	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58383	1.87	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58383	2.21	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58383	2.23	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58383	3.54	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58383	5.27	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58384	8.13	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58384	58.50	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58385	4.59	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58385	35.39	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58386	1.61	underburn		thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58386	2.49	underburn		thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58386	9.24	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	laspen restorationch restoration	machine pile/underburn
58386	10.68	underburn		thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58387	2.15	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58387	4.17	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58387	19.74	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58387	19.83	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58387	25.40	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58387	50.34	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58388	1.15	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58388	9.36	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58388	11.71	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58388	13.86	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58388	15.15	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58388	29.01	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58388	124.88	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58389	2.42	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
58389	11.19	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
58389	27.09	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	laspen restorationch restoration	machine pile/underburn/mow
58389	29.11	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	laspen restorationch restoration	underburn/hand pile/mow
58390	24.04	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile
58391	1.78	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58391	4.93	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58391	12.13	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch	hand pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
								restoration	
58391	12.48	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58391	70.02	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	laspen restorationch restoration	machine pile/underburn
58391	118.46	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	laspen restorationch restoration	machine pile/underburn
58392	5.64	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	laspen restorationch restoration	hand pile
58392	26.70	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	laspen restorationch restoration	machine pile/underburn
58393	1.39	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58393	1.83	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58393	2.83	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58393	3.75	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58393	7.24	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	laspen restorationch restoration	machine pile/underburn
58393	9.89	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58393	11.94	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58393	112.81	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	laspen restorationch restoration	machine pile/underburn
58394	1.50	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58394	1.51	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58394	2.96	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
58394	4.01	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58395	9.54	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58395	12.19	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58396	3.09	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58396	8.33	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58396	8.43	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58396	12.65	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58396	78.01	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58396	88.76	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58397	1.46	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58397	5.14	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58397	5.32	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58402	12.42	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58404	1.08	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58404	1.52	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58404	1.82	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58405	3.68	thin up to 12" dbh	hand pile	underburn		underburn		underburn	
58405	6.43	underburn	M	underburn	M	underburn	M	underburn	M
58409	20.86	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58410	18.06	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58410	22.39	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58410	162.94	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58412	2.19	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58413	2.77	underburn		underburn		underburn		underburn	
58413	20.48	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58416	5.87	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58417	1.77	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58417	9.30	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58417	41.90	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58418	5.31	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58418	23.34	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58419	15.96	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58419	82.36	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58420	2.37	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58420	2.78	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58420	8.24	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58420	40.02	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58421	3.07	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58421	32.56	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58422	5.72	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58422	34.31	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58423	33.66	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58424	4.48	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58424	22.75	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58425	2.86	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58425	14.77	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58425	21.18	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58425	31.17	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58426	1.09	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58426	24.45	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58427	4.72	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58430	25.22	underburn	M	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
58431	18.68	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58431	24.83	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58432	10.20	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58435	1.25	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58435	14.45	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58669	2.97	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58669	3.16	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58669	3.35	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58669	5.78	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58669	6.28	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58669	15.42	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58669	20.79	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58714	5.20	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58719	8.26	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58719	44.35	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58720	10.80	underburn	M	underburn	M	underburn	M	underburn	M
58722	1.27	underburn	M	underburn	M	underburn	M	underburn	M
58722	3.76	underburn		underburn		underburn		underburn	
58723	3.03	underburn	M	underburn	M	underburn	M	underburn	M
58723	4.05	underburn		underburn		underburn		underburn	
58723	28.88	underburn		underburn		underburn		underburn	

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58723	108.44	underburn	M	underburn	M	underburn	M	underburn	M
58724	15.66	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58726	38.15	underburn	M	underburn	M	underburn	M	underburn	M
58726	123.15	underburn	M	underburn	M	underburn	M	underburn	M
58727	5.27	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58728	12.21	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58729	2.69	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58729	21.72	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58730	3.54	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58730	10.33	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58730	27.63	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58730	100.82	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58731	1.43	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58731	3.08	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58731	6.74	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58731	7.65	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58732	12.92	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58732	29.28	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58733	17.21	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58734	3.81	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58734	27.18	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58735	1.29	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58735	14.99	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58735	15.72	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58736	1.30	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58736	15.75	underburn	M	underburn	M	underburn	M	underburn	M
58737	7.71	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58737	22.85	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58738	12.15	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
58738	55.57	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
58739	4.86	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58739	15.10	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58740	1.67	underburn	M	underburn	M	underburn	M	underburn	M
58740	21.24	underburn	M	underburn	M	underburn	M	underburn	M
58741	5.43	ME	underburn/hand pile	ME	underburn/hand pile	ME	underburn/hand pile	ME	underburn/hand pile
58741	15.81	ME	hand pile	ME	hand pile	ME	hand pile	ME	hand pile
58742	2.49	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58742	3.90	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
58742	10.95	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
58743	12.34	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
58744	5.80	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	laspen restorationch restoration	underburn/hand pile
58744	14.88	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58744	15.01	underburn		thin > 12" dbh	machine pile on trails/underburn/hand pile	thin > 12" dbh	machine pile on trails/underburn/hand pile	laspen restorationch restoration	machine pile/underburn
58745	1.33	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58745	28.17	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58745	35.92	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
58746	1.75	underburn	M	underburn	M	underburn	M	underburn	M
58746	21.95	underburn	M	underburn	M	underburn	M	underburn	M
58747	4.32	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58747	10.84	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58748	6.11	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58748	34.94	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58749	16.36	underburn	M	underburn	M	underburn	M	underburn	M
58750	36.07	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58751	13.51	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
58752	2.81	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58752	7.17	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58753	19.78	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58754	31.31	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58755	61.87	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58756	24.46	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow
58757	13.16	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58758	4.87	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58758	9.29	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58759	22.05	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow
58760	3.11	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58760	20.63	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58760	156.60	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58761	1.25	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58761	12.82	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58761	34.96	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58761	109.39	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58762	1.13	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58762	3.13	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58764	1.55	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58765	4.79	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58765	54.46	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
58766	1.07	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58766	1.20	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58766	1.82	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58766	5.80	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58766	20.79	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58767	12.91	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58768	17.61	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58769	15.09	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58769	80.18	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58770	8.85	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58771	37.57	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58772	1.49	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
58772	3.12	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile	thin up to 8" dbh in defensible space	hand pile
58772	11.99	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58772	12.63	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58773	67.71	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58774	1.60	underburn		thin > 12" dbh	hand pile	thin > 12" dbh	hand pile	thin > 12" dbh	hand pile
58776	4.69	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
58776	10.96	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
58777	8.17	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
58777	27.69	underburn	M	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
58778	3.87	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
58778	34.69	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58779	15.29	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
58779	68.11	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
58780	8.48	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58780	13.73	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58781	44.87	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
58782	25.10	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58783	4.45	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
58783	36.26	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
58784	2.37	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58784	19.70	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
58785	26.28	underburn		underburn		underburn		underburn	
58786	6.46	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58786	12.07	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
58788	2.66	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59127	2.90	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59128	2.67	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59129	65.93	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59130	7.73	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59130	18.12	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59131	17.24	thin up to 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59131	55.00	thin up to 12" dbh	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59133	24.13	thin up to 12" dbh	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59134	1.97	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59134	12.29	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
59135	3.36	underburn		thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh	underburn/hand pile
59135	15.20	underburn		thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile
59136	24.81	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59137	34.82	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow	thin up to 12" dbh	underburn/hand pile/mow
59137	123.99	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59138	8.40	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59139	2.43	thin up to 12" dbh	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin up to 12" dbh	underburn/hand pile
59141	3.87	thin up to 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin > 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59141	7.13	thin up to 12" dbh	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59142	18.00	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59143	9.47	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow
59143	13.00	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow
59144	18.34	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59145	13.93	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59146	2.14	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59146	8.28	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59146	87.81	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59147	2.21	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59147	12.71	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59148	17.54	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
59149	24.32	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh	underburn/hand pile
59150	37.33	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59154	30.81	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59155	4.57	no treatment	no treatment	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59155	17.66	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59156	13.42	no treatment	no treatment	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59156	16.60	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59157	15.87	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow
59157	18.45	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow	thin up to 12" dbh-dwarf mistletoe Control	hand pile/mow
59158	9.32	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59158	15.78	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59159	6.95	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow
59159	19.24	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow	dwarf mistletoe Control	hand pile/mow
59160	11.93	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59161	3.26	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59161	19.48	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59162	1.73	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59162	9.54	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59163	17.05	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59163	29.81	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59164	9.25	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
59165	1.55	no treatment	no treatment	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh	machine pile
59165	7.74	thin up to 8" dbh in defensible space	underburn/hand pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59165	24.97	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59166	10.04	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59167	29.18	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59169	21.94	underburn	M	underburn	M	underburn	M	underburn	M
59170	4.19	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59170	5.57	underburn	M	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59171	10.82	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59171	21.52	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59172	2.59	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59172	26.55	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59173	22.34	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59174	28.98	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	underburn/hand pile/mow	thin > 12" dbh	underburn/hand pile/mow
59176	1.43	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59177	2.49	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59177	18.00	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59178	2.62	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood/thin > 12" dbh	machine pile/mow
59178	24.84	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	shelterwood/thin > 12" dbh	machine pile/mow
59179	27.46	no treatment	no treatment	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59180	15.94	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59181	10.43	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
59181	37.57	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59182	8.68	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59182	16.62	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59183	10.56	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59184	8.32	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59184	15.42	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59185	15.06	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59185	20.40	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59186	11.36	no treatment	no treatment	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh in connectivity corridor	machine pile/mow	thin > 12" dbh	machine pile/mow
59186	30.20	no treatment	no treatment	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59187	18.64	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh	underburn/hand pile
59188	19.91	no treatment	no treatment	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh in connectivity corridor	underburn/hand pile	thin > 12" dbh	underburn/hand pile
59189	19.28	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59190	30.32	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59191	1.24	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59191	22.38	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59192	15.69	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59193	1.35	underburn	M	underburn	M	underburn	M	underburn	M
59193	36.01	underburn	M	underburn	M	underburn	M	underburn	M
59193	41.78	underburn	M	underburn	M	underburn	M	underburn	M
59194	5.83	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59194	28.94	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59195	4.81	thin up to 12" dbh	machine pile on trails/underburn/hand	thin up to 12" dbh	machine pile on trails/underburn/hand	thin up to 12" dbh	machine pile on trails/underburn/hand	thin up to 12" dbh	machine pile on trails/underburn/hand

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
			pile		pile		pile		pile
59195	10.25	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile	thin up to 12" dbh	machine pile on trails/underburn/hand pile
59196	15.41	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59197	9.57	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59197	23.00	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59197	29.27	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59198	5.64	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59198	9.27	underburn	M	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow	thin > 12" dbh	underburn/mow
59199	15.62	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59200	2.15	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59200	31.05	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59201	10.82	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59202	20.53	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59202	37.22	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59203	21.38	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59204	2.75	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59204	2.99	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59204	4.55	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
59204	20.22	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59205	9.44	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59206	13.26	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59207	5.97	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59208	17.81	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59209	3.35	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59209	6.01	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59210	11.71	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59210	12.00	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59211	19.28	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59212	17.31	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59213	48.17	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59214	1.80	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
59214	14.76	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
59214	29.32	underburn	M	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
59215	2.33	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59215	12.43	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59216	3.30	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59216	18.93	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59217	16.03	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
59218	17.78	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59219	29.35	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59220	14.18	underburn	M	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh	underburn/mow
59221	13.30	underburn	M	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh in connectivity corridor	underburn/mow	thin > 12" dbh	underburn/mow
59221	21.16	underburn	M	thin > 12" dbh in connectivity corridor	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh in connectivity corridor	machine pile on trails/underburn/hand pile/mow	thin > 12" dbh	machine pile on trails/underburn/hand pile/mow
59222	9.66	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow	thin up to 12" dbh	machine pile/underburn/hand pile/mow
59223	2.44	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59223	5.37	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59223	12.73	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow	thin up to 8" dbh in defensible space	underburn/hand pile/mow
59224	1.16	ME	underburn/hand pile	ME	underburn/hand pile	ME	underburn/hand pile	ME	underburn/hand pile
59224	12.08	ME	underburn/hand pile	ME	underburn/hand pile	ME	underburn/hand pile	ME	underburn/hand pile
59225	5.14	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
59225	38.36	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile	thin up to 12" dbh	underburn/hand pile
59226	48.59	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59227	68.53	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59228	3.63	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
59228	25.99	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59229	1.33	underburn		thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh	machine pile
59229	2.42	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
59229	2.80	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile	thin up to 12" dbh	hand pile
59229	2.96	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59229	4.63	underburn		thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh	machine pile
59229	8.73	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59230	11.03	thin up to 12" dbh	machine pile on trails/underburn/hand	thin up to 12" dbh	machine pile on trails/underburn/hand	thin up to 12" dbh	machine pile on trails/underburn/hand	thin up to 12" dbh	machine pile on trails/underburn/hand

STAND	ACRES	Alternative 2		Alternative 3		Alternative 4		Alternative 5	
		Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action	Veg. Action	Fuel Action
			pile/mow		pile/mow		pile/mow		pile/mow
59230	20.16	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow	thin up to 12" dbh	machine pile on trails/underburn/hand pile/mow
59231	1.83	no treatment	no treatment	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59231	11.76	thin up to 8" dbh in defensible space	underburn/hand pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh	machine pile
59231	75.07	no treatment	no treatment	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh	machine pile
59232	2.66	underburn		thin > 12" dbh	machine pile	thin > 12" dbh	machine pile	thin > 12" dbh	machine pile
59232	30.56	underburn		thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh in connectivity corridor	machine pile	thin > 12" dbh	machine pile
59233	4.59	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59233	6.22	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow
59234	2.60	no treatment	no treatment	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow	thin > 12" dbh	machine pile/mow
59237	1.75	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment	no treatment
59238	16.19	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow	thin up to 12" dbh	hand pile/mow

APPENDIX B

Stewardship Contracting and Multi-Party Monitoring

Background

Section 347 of the 1999 Omnibus Appropriations Act (Public Law 105-277; H.R. 4328) authorized the USDA Forest Service to implement up to 28 stewardship contracting pilot projects to test new contracting authorities. The legislative language indicated the agency had been granted these authorities for three reasons: 1) to test the potential advantages of greater collaboration within the agency and with outside partners; 2) to test the potential for effective and more efficient land management; and 3) to help meet the needs of local and rural communities. In 2000 and 2002 an additional 56 pilot projects were authorized. The Sisters Ranger District applied for Stewardship Pilot Authority for the Metolius Basin Forest Management Project in 2002.

Land management goals for projects under Section 347 of P.L. 105-277 include,

- Use of prescribed fires to improve the composition, structure, condition, and health of stands or improve wildlife habitat;
- Noncommercial cutting or removing of trees or other activities to promote healthy forest stands, reduce fire hazards, or achieve other non-commercial objectives;
- Road and trail maintenance to restore or maintain water quality, soil productivity, habitat for wildlife and fisheries, or other resource values;
- Watershed restoration and maintenance;
- Restoration and maintenance of wildlife and fish habitat; and
- Control of noxious and exotic weeds and reestablishing native plant species.

What Is Stewardship Contracting?

Due to a number of factors (including declining Agency budgets), employment opportunities and project implementation within the National Forest system have been steadily declining. Despite these reductions, the need for restorative or maintenance work in ecosystems remains paramount. Such work includes watershed restoration and maintenance, road obliteration for sediment control, wildlife habitat improvements, fuel load reductions, timber stand improvements, and insect/disease protection. In the past, these stewardship projects were completed largely within the confines of timber sale contracts and performed by an independent contractor or smaller sub-contracting firms. Revenues generated within these sales provided the funds necessary for

stewardship work. However, with a decline in the federal timber sale program, available funds for such work have declined as well. Limited appropriations from Congress and restricted money within existing trust funds further exacerbate the situation.

Given this inadequacy of appropriations and the continued likely trend of lower timber sales on federal lands, creative approaches must be utilized to complete the necessary work and simultaneously contribute to the economic growth of local rural communities. Stewardship contracting may provide some solution to this growing dilemma.

Land stewardship contracting can best be explained as a set of natural resource management practices that seeks to promote a closer working relationship with local communities in a broad range of activities that improve land conditions, consistent with a community's ecological, social, and economic objectives. Such projects are seen as a means of shifting the focus of federal forest and rangeland management towards a desired future resource condition, rather than meeting on-the-ground targets or a predetermined schedule of resource outputs. They are also considered a means by which federal agencies can contribute to the development of sustainable rural communities through restoring and maintaining healthy forest ecosystems and providing a continuing source of local income and employment.

The concept of stewardship contracts began in the 1980s, when service management contracts were first introduced as a response to shrinking federal budgets, reduced personnel, and demands from the public for a broader range of outputs from federal forests and rangeland. These early contracts were designed to create significant savings of public funds through improved contract administration, specification of desired end-results, and the consolidation of multiple stand improvement contracts into one mechanism. Although these contracts were initially developed to facilitate traditional timber management objectives, they soon evolved into a more comprehensive approach, supporting the many tenets and practices defined within ecosystem management. In the 1990s, these early stewardship contracts broadened to include local small business participation, alternative land management strategies, and locally based planning efforts.

Today, some or all of the following key points can be used to characterize stewardship contracting:

Broad-based public (community) collaboration: The intent of stewardship contracts is to develop a process of broad-based community participation that is open, transparent, and inclusive. This collaboration can be used to bolster public and agency learning, to encourage interaction among a broad array of stakeholders, and to utilize the existing knowledge base. As such, collaboration often facilitates the production of a unified vision (desired future conditions) that can then be applied during implementation and monitoring phases of a given project.

Provisions for multi-year, multi-task, end-results oriented activities: Within stewardship contracts, bidders are typically given a description of the desired future condition from the agency and asked to describe how they would use their skills and experience to achieve the defined vision. This format provides an opportunity for contractors to be flexible and innovative in their approaches and practices. These contracts can incorporate numerous tasks, over a course of years to reach the desired goal and objectives.

Comprehensive approach to ecosystem management: Within stewardship contracts, techniques and practices are designed under the umbrella of holistic, ecosystem approaches. Often these management activities are coordinated within a diverse set of objectives, including vegetation

management, wildlife habitat enhancement, recreational development, and stream or riparian restoration. They also refocus the scope of projects from stand-level (as used in the past) to new ecological scales.

Improved administrative efficiency and cost to the agency: It should be noted that stewardship contracts are designed to complement and expand, not replace existing procurement or timber sale instruments. They are an alternative means of implementing ecosystem management policies, relying on the shift of forest management towards achieving a desired future resource condition rather than meeting an assigned target or predetermined schedule of output. Unlike timber sale contracts or service contracts, stewardship contracts are designed to combine a set of activities into a single contract, thereby improving contract efficiency and possibly reducing cost to the Agency.

Creation of a new workforce focused on maintenance and restoration activities: Because stewardship contracts often contain a wide array of services (including those that involve the collection of multiple forest products), such contracts have the ability to contribute to the development of sustainable rural communities. Through improved and increased restoration/maintenance of the natural environment, stewardship contracts help provide living wages, new employment opportunities, and overall diversification of rural economies.

To this end, land stewardship contracts benefit the agency and the public in different ways. For the Forest Service, land stewardship contracts provide a means to improve contracting flexibility and efficiency; to address forest health concerns in areas of low-value material; and to increase collaboration among federal agencies and outside partners. Within the surrounding local communities, stewardship contracts are capable of promoting local involvement in National Forest management, while also strengthening local economies through the diversification of available jobs and the development of new and expanded markets. From a biological perspective, stewardship contracts provide a means of improving the health of forest systems, such as reducing the threat of wildfire, improving forest composition and structure, improving wildlife habitat and forage, and improving water quality.

Types of Contracts

There is a variety of authorities that are being tested under the Stewardship Contracting pilots. Following is a brief description on the different types.

Exchange of Goods for Services

The exchange of goods for services provides a means of extending the value of appropriated funds available to help carry out needed ecosystem restoration, maintenance, and improvement activities. This extension occurs by virtue of the fact that some or all of the value of commercial timber products being sold is retained and reinvested on-site as opposed to being returned to the Treasury or deposited in one of the Agency's special trust funds. The existing financial structure within the Forest Service accounts for the disposal of goods based upon receipts, and the purchase of services based upon expenditures from appropriated and other special funds.

Receipt Retention

Through receipt retention, portions of proceeds from the sale of commercial products can be retained at the local level to fund other non-revenue producing activities. However, they must be reinvested in the specific pilot project that generated them or by another approved pilot project. Historically, the Agency has had limited authority to retain receipts through the various Forest Service trust funds (e.g., Knutson-Vandenberg Act, the Brush Disposal Act, and the Salvage Sale Fund provisions within the National Forest Management Act). In nearly all of the instances, funds from these accounts must be re-applied to those project areas in which commercial material has been extracted and any remaining funds must be returned to the National Forest Fund in the federal Treasury for future Congressional appropriation.

Designation by Description or Prescription

Designation by description or prescription offers a potential way to reduce sale preparation costs and to more fully apply the concept of end-results contracting. Traditionally, the designation, marking, and supervision of timber harvesting activities are conducted by federal employees or service contractors who have no prospective tie to the timber sale, thereby ensuring the accountability for products sold by the government. Under the expanded authority, land managers can provide prescriptions or area designations that clearly describe the silvicultural objective or desired “end results” in replace of federal designation and marking. It should be noted that designation by description has been used in the past under very strict silvicultural prescriptions (e.g., in areas designated for clearcuts, by specific species, by live versus dead material, or by basal area).

Best-Value Contracting

Best-value purchasing allows the Forest Service to use factors besides price when awarding contracts. These other factors include: past performance, work quality, delivery, and experience. In making award decisions, the Forest Service may, among other techniques, compare offers and hold discussions and negotiations with offerors, and may make awards to a more qualified firm at a higher price. As a result, those vendors who have performed well in the past, provided quality work, complied with wage requirements, and have high standards of workmanship will have a competitive advantage.

Multi-year Contracting

Among the desired goals of stewardship projects is the ability to engage contractors in long-term management services. It has been theorized that operators who provide services within a given management area over a long period are likely to develop a stronger sense of stewardship for that area. Additionally, the use of multi-year contracts may help to provide more stability for the contractor, as well as administrative continuity for the Forest Service contract supervisor.¹ Historically, both timber sales and service contracts operated under specific time limitation.

¹ Ringgold, 1999. Land Stewardship Contracting in the National Forests: A Community Guide to Existing Authorities.

Whereas both can extend beyond the appropriations period during which they were initiated, the National Forest Management Act limits the length of timber sale contracts to 10 years (and restocking efforts in five years) and annual Congressional appropriations limit the length of service contracts. Unlike multiple year contracts, which require the Forest Service to exercise an option for each designated project year, multi-year contracts allow the purchase of more than one year's requirement of product or service only at the onset of the project.

What is Multiparty Monitoring/Evaluation?

Multi-party monitoring is a process which seeks to engage community based groups, local/regional/national interest groups, and public agencies to ensure that natural resource management is responsive to diverse interests and objectives. It validates and reduces the amount of bias in project evaluation. In a sense, the multi-party process not only legitimizes monitoring and evaluation, it helps build bridges between a variety of parties and interests through effective and meaningful public involvement (from criteria development through the implementation phase of a project). A multi-party approach can improve the process through increased collaboration, improved public education, and an increase in the overall understanding of pilot efforts and impact.

The multi-party monitoring team for the Metolius Basin Forest Management Project is currently getting established. Participants from the local community, environmental groups, wood products industry, Confederated Tribes of Warm Springs, representatives from Senator Wydens' office, and state and federal resource agencies are expected. Goals and objectives for the monitoring group are also being established. Contact Bob Flores, and the Sisters Ranger District for further information.

APPENDIX C

Recommended Project Enhancements _____

There are many actions that the Forest Service may apply to enhance project design, but may not be required to avoid or mitigate potentially significant impacts from implementing the selected Alternative. Optional project enhancements, listed in this Appendix, would be considered during project implementation. There may be other enhancements that may be identified during project implementation. These recommendations are similar to a menu of tools the Forest Service could use depending on site-specific conditions, funding, and availability of resources.

Fuels

- Maintenance of Treated Areas - Maintain low fuel levels over time in areas treated. Monitor fuel levels and arrangements approximately every 5 years to determine whether actions are needed to reduce fuels. Consider a variety of methods to maintain low fuel levels, including natural or prescribed fire, pruning and mowing.
- Protect improvements during prescribed burn operations.

Snags and down wood

Protect existing snags and down wood, particularly along riparian areas. Consider topping snags that must be treated to reduce hazards to people. If snags need to be removed along the Metolius River, consider dropping them into the river to increase harlequin duck loafing habitat.

Protect all snags >21" diameter outside recreation facilities during harvest activities.

Leave more than minimum levels (125%) of snags and down woody material to accommodate losses from post harvest activities in shelterwood cuts.

Guidelines for Locating Untreated Forest Patches during Treatment

Within Shelterwood and Larch Restoration Units (Alternative 5 only)

- Leave green tree replacements in groups, where possible. This helps reduce blowdown and protect fragments of late-successional habitat. These should be composed of the largest, oldest live trees, decadent or leaning trees, and hard snags occurring in the area.
- Identify and record locations of untreated patches in the GIS corporate database, harvest layers and associated data dictionary. Untreated patches should be protected until adjacent areas are again providing the missing components and processes.

Wildlife

Goshawk

- Underburning is the preferred fuels treatment within goshawk focal areas.
- Machine piling is not recommended.

Flammulated Owl And White-headed Woodpecker

- Maintain dense thicket habitat, especially surrounding or adjacent to large ponderosa pine, for roosting areas for flammulated owls and foraging habitat for white-headed woodpeckers at a rate of one patch every 5-10 acres.
- Strive to maintain 20-40% canopy closure.

Big Game

Close roads to show a trend toward meeting the 2.5 miles/square mile open road density standard (WL-53).

Leave patches of bitterbrush within winter range to provide winter forage.

Red-tailed Hawks

- Where large (>21" dbh) snags exist adjacent to openings, protect from harvest and post-harvest activities.

Neo tropical Birds

- To avoid potential nest destruction and loss of broods for neotropical migrant birds, schedule harvest and post harvest activities after the nesting season (after June 15th).
- Leave thickets of ponderosa pine to accommodate the foraging needs of species like the flammulated owl and western tanager.

Waterfowl

Burn meadows during the fall if possible to minimize disturbance to nesting waterfowl.

Plants

Peck's Penstemon and Tall Agoseris

Within "Managed" populations

- Use prescribed fire as fuel treatment of choice- it is beneficial to the plant
- Burning piles is less beneficial because it sterilizes areas of soil and plants

- Chipping, leaving lots of logging slash on ground is not beneficial- plant needs bare soil to seed

Watershed and Soils

Required mitigation are listed in the body of the Environmental Impact Statement, Chapter 2. Following are a range of BMPs to consider, where applicable. Some of these are also listed in Chapter 2.

Best Management Practice's (BMPs) for Soil and Water Mitigation:

The following BMPs can be used to reduce potential impacts to water quality. BMPs should be selected and tailored for site-specific conditions to arrive at the project level BMPs for the protection of water quality. A complete explanation of the BMPs is found in General Water Quality Best Management Practices (USDA, 1988) and is available at the District Office or Supervisors Office.

Roads

- R1- General Guidelines for the Location and Design of Roads
- R2- Erosion Control Plan
- R3- Timing of Construction Activities
- R4- Road Slope Stabilization
- R6- Dispersion of Subsurface Drainage Associated with Roads
- R7- Control of surface Road Drainage Associated with Roads
- R8- Constraints Related to Pioneer Road Construction
- R9- Timely Erosion Control Measures on Incomplete Roads and Stream Crossing
- R11- Control of Sidecast Material
- R12- Control of Construction in Streamside Management Units
- R14- Bridge and Culvert Installation and Protection of Fisheries
- R15- Disposal of Right-of-Way and Roadside Debris
- R17- Water source Development Consistent with Water Quality Protection
- R18- Maintenance of Roads
- R19- Road Surface Treatment to Prevent Loss of Materials
- R20- Traffic Control During Wet Periods
- R21- Snow Removal controls to Avoid Resource Damage
- R23- Obliteration of Temporary Roads and Landings

Timber

- T1- Timber Sale Planning
- T2- Timber Harvest Unit Design
- T3- Use of Erosion Potential Assessment for Timber Harvest Unit Design

T4- Use of Sale Area Maps for Designating Water Quality Protection Needs
T5- Limiting the Operating Period of Timber Sale Activities
T6- Protection of Unstable Lands
T7- Streamside Management Unit Designation
T8- Streamcourse Protection
T9- Determining Tractor Loggable Ground
T10- Log Landing Location
T11- Tractor Skid Trail Location and Design
T13- Erosion Prevention and Control Measures During Timber Sale Operations
T14- Revegetation of Areas Disturbed by Harvest Activities
T15- Log Landing Erosion Prevention and Control
T16- Erosion Control on Skid Trails
T17- Meadow Protection During Timber Harvesting
T18- Erosion Control Structure Maintenance
T19- Acceptance of Timber Sale Erosion Control Measures Before Sale Closure
T21- Servicing and Refueling of Equipment
T22- Modification of the Timber Sale Contract

Fire and Fuel Management Units

F1- Fire and Fuel Management Activities
F2- Consideration of Water Quality in Formulating Prescribed Fire Prescriptions
F3- Protection of Water Quality During Prescribed Fire Operations
F4- Minimizing Watershed Damage from Fire Suppression Efforts
F5- Repair or Stabilization of Fire Suppression Related Watershed Damage

Watershed Management

W1- Watershed Restoration
W2- Conduct Floodplain Hazard Analysis and Evaluation
W3- Protection of Wetlands
W5- Cumulative Watershed Effects
W7- Water Quality Monitoring

Vegetative Manipulations

VM1- Slope Limitations for Tractor Operation
VM2- Tractor Operation Excluded from Wetlands and Meadows
VM4- Soil Moisture Limitations for Tractor Operation

Recreation / Social Concerns

- Keep interested public informed of the ongoing activities, their potential short-term impacts and their scheduled timing. Use Multi-party Monitoring to help evaluate implementation (see Appendix B on Stewardship Authorities and Multi-party Monitoring).
- Metolius Heritage Demonstration Project – encourage visitors and residents to visit the interpretive displays in the demonstration units to learn about the objectives of different vegetation management methods and to view the results of these methods.
- Provide information for public about proposed changes in road status (consider posting information at road entrances several months or more prior to implementation)
- It is recommended that vegetation treatment (hazard tree removal, thinning, burning and hauling) adjacent to high use areas, occur during periods when recreation and summer home use is low (before Memorial Day and after Labor Day, and weekends during deer hunting season). To minimize conflict between recreational traffic and timber haul, post haul routes with caution signs.
- Mowing would be allowed during most of the year unless it is adjacent to private lands, developed recreation sites and the summer homes. In these adjacent areas, mowing would occur in the lowest season of use to minimize the effects of noise and dust.
- Minimize the effects of smoke on the residential areas and high-use recreation areas (along the Metolius River).
- Tract Objectives will be used when treating summer home lots. Owners should be consulted and involved in the treatment decisions. Provide screening between lots when feasible.
- Complete vegetation management plans for developed recreation sites to help guide vegetation treatments. Environmental surveys and inventories would be completed by specialists as a result of this project.
- Maintain screening (i.e. do not remove all thickets or shrubs) near camp sites.

Scenic Quality

- Slash treatment shall be completed within the period as required by Deschutes National Forest Land and Resource Management Plan Standards and Guidelines (within one year for the Metolius Basin). Small hand pile and then burn is desirable within the immediate Foreground landscape (0-300 feet) in proximity of residential area, recreation site, and road and trail corridor that falls within the Foreground Scenic View landscape areas.
- Paint on backsides of all leave trees, as necessary, to help mitigate the effects of residual paint on scenic resource following treatments. When possible, use cut tree marking to minimize painted trees left behind.
- Removal of ribbons and other timber harvest markers following post treatment and completion of the project.

- Where possible, design and locate skid trail and landing area at least 300 feet away from primary travel corridor, such as Forest Road 14, Road 12 and Nordic, hiking, and horse trails, so that it will not be highly visible from the scenic and travel corridor.
- Minimized ground disturbance within the Foreground sensitive viewing areas to reduce soil contrast that may adversely affect scenic quality. Acceptable and recommended measures including, but not limit to, logging on pack snow and/or frozen ground, utilize cable and/or helicopter logging system.
- When and if possible, avoid scorching above 2/3 of dominant and co-dominant tree crown during a prescribe burn within a proposed treatment areas in the Foreground landscape. Utilize appropriate measure(s); such as thinning and/or pruning, to guard against high crown fire that may adversely affected scenic quality. Severely damaged and/or burned trees (2/3 burnt crown or more) shall be treated and/or removed with a year following the completion of treatment.

APPENDIX D

Ecological Types and Site Potentials

This analysis was completed to determine where and how much big game forage could be supported within the project area. For additional information, see Chapter 3; Wildlife, & Soils.

Ecological Unit Inventories (EUI) and maps display soil types and potential natural vegetation of a site. Existing maps reflect what is currently in an area, but potential natural vegetation may differ from the current vegetation. At any time, the potential natural vegetation described in an EUI may or may not exist on the site, but the site still has the potential to produce that vegetative type. This concept is the foundation of an ecotype.

Within the Metolius Basin Forest Management project area, EUI map units were grouped to develop five ecological types, four major and one of limited extent (Upper Deschutes Soil Survey 2000). Factors used to group EUI mapping units into ecotypes include climate, topography, vegetation, soil parent material, and age of the surface. The existence of seasonally high water tables was one of the main factors used to group Ecotypes in this project area. Areas with seasonally high water tables collect runoff from higher elevations and tend to favor mixed conifer vegetation, while dryer sites adjacent to these areas favor ponderosa pine communities.

Table 1 lists the five ecotypes identified in the project area, the EUI mapping units used to identify the ecotypes, and the acres of each.

Table 1. Upper Deschutes Soil Survey (EUI) map unit groupings by Ecotype

Ecotype	Ecotype Name	EUI Soil Mapping Units*	Acres
1	Ponderosa pine high site	4C, 4D, 15C, 122C, 123D, 124C, 125D, 146C	8382
2	Ponderosa pine high site steep slopes	161E, 163E	1890
3	Mixed conifer	13C, 16E	593
4	Mixed conifer moist	29A , 48C, 143B, 145C, 164A	5567
5	Types of limited extent		106
Total			16538²

* See Table 4 for a description of mapping units
From: Natural Resources Conservation Service (NRCS)

² Includes all ownerships (not just National Forest lands)

Uses Of Ecotypes During Planning

Understanding different ecotypes within a planning area can help identify areas that have different:

- Site productivity (including tree canopy cover, shrub and grass species, and shrub and grass productivity)
- Treatment options for brush (burn and mow, burn or mow, mow only)
- Fire risks (fire regimes)
- Expected seral stages following disturbance
- Expected shrub recovery times (ecotype one, longer recovery than ecotype two)
- Potential for conversion to less desirable species (increase in rabbitbrush)

Table 2 lists the major vegetation types as described in Volland, 1985 for each of the four major ecotypes. Table 3 lists additional information about type of vegetation and potential canopy cover by eco-type.

Table 2: Major plant associations by Ecotype (Volland, 1985).

Ecotype	Major Volland Vegetation Type	Potential Natural Vegetation
1	CP-S2-17 (p 58)	Ponderosa pine/bitterbrush-manzanita/fescue
2	CP-S2-13 (p 61)	Ponderosa pine/bitterbrush-manzanita/needlegrass
3	CW-C2-12 (p 74)	Mixed conifer/snowbrush-chinkapin/pinegrass
4	CD-S6-12 (p 78)	Mixed conifer/snowberry/twinflower flatlands

Table 3: Potential vegetation types and percent canopy cover by Eco-Type.

Eco-Type	Potential Natural Vegetation	% Canopy Cover
1	Ponderosa pine	7-40
	Bitterbrush	3-43
	Manzanita	2-25
	Fescue	3-23
2	Ponderosa pine	5-40
	Bitterbrush	5-30
	Manzanita	1-40
	Needlegrass	T-5

Eco-Type	Potential Natural Vegetation	% Canopy Cover
3	Ponderosa pine	7-52
	Douglas fir	0-40
	White fir	0-40
	Snowbrush	0-20
	Chinkapin	0-20
	Pinegrass	5-60
4	Ponderosa pine	2-20
	Douglas fir	T-30
	White fir	1-50
	Snowberry	2-30
	Twinflower	T-40

Table 4: Additional site productivity data from site index

Map Unit Symbol	Map Unit Name (soil series names and soil phases)	Site Index	Acres
4C	Allingham-Circle Complex, 0-15 % slope	77, 77*	2018
4D	Allingham-Circle Complex, 15-30 % slope	77, 77	287
13C	Belrick fine sandy loam, 0-15 % slope	91	196
15C	Belrick fine sandy loam, Dry 0-15 % slope	87	483
16E	Belrick-Douthit Complex, 30-50 % slope	91, 94	396
29A	Cryaquolls, 0-3 % slope		399
48C	Flarm-smiling Complex, 0 to 15% slopes		82
122C	Sisters Loamy Sand, 0-15 % slope	79	1627
123D	Sisters- Yapoah Complex, 15-30 % slope	79, 76	209
124C	Smiling Sandy Loam, 0-15 % slope	79	2171
125D	Smiling-Windeggo Complex, 15-30 % slope	79, 66	618
143B	Suiloten-Circle Complex, 0-8 % slope	120	3645
145C	Suttle Very Gravelly Loamy Sand, 0-15 % slope	110	1199
146C	Suttle Very Gravelly Loamy Sand, Dry, 0-15 % slope	90	968
161E	Windeggo-Smiling Complex, 30-50 % slope	66, 79	1061
163E	Windeggo-Smiling-Rock Outcrop Complex, 30-70 % slope	66, 79	829
164A	Wizard Sandy Loam, 0-3 % slope	85	245

From: Natural Resources Conservation Service (NRCS), Upper Deschutes Soil Survey.

*Site Index

Ecotype and Big Game Habitat

Ecological types were mapped for the project area using information on soil types and the potential natural vegetation. The potential natural vegetation may differ from the existing

vegetation, however the ecotype has the potential to produce the climax vegetation if disturbance events were to occur naturally.

Four ecotypes were developed for the Metolius Basin project area. They are as follows: ponderosa pine high site, ponderosa pine high site – steep slopes, mixed conifer, and mixed conifer moist. Each area shows differences in site productivity, fire risks, expected shrub recovery times and seral stages, and conversion potential to less desirable species. Only ponderosa pine sites show the potential to produce bitterbrush in the amounts needed for winter range requirements. The mixed conifer sites do not contain the potential to produce bitterbrush under natural conditions. It is present on site currently, however, with more frequent fire regimes it probably would not persist.

Approximately ½ (40%) the winter range consists of the mixed conifer moist ecotype (Types 3 and 4). Bitterbrush is not considered to occur as the potential natural vegetation for this ecotype. However, snowberry is identified to be present in minor amounts, which may offer similar palatability for deer. This area also contains the majority of the urban interface potential for the project area and exhibits high human use. The area receives low to moderate use by deer and elk. Most deer occurring in the area are yearlong residents probably due in some part to supplemental feeding by area residents. Bitterbrush is present in this ecotype currently. However, it is patchy in nature. Snow depths in the Basin may preclude use in some areas, which may account for the low to moderate use. Much of the use seems to be concentrated near the Metolius River and the urban interface.

The remainder of the project area consists of the ponderosa pine ecotypes (Types 1 and 2). Bitterbrush is a major component of the potential natural vegetation that is an important food source for big game during the winter months. See Table 11 for information on big game habitat within the ponderosa pine ecotype. In years of light snowfall, many deer and elk will stay in the lower elevations. In heavy snow years, most deer and elk move out of the Metolius Basin to the Crooked River National Grasslands and private lands and north to the Warm Springs Reservation.

Table 5. Big game habitat within the ponderosa pine ecotype.

Big Game Habitat	Ponderosa Pine – High Site	Ponderosa Pine – Steep Slopes
Summer Range	640 acres	683 acres
Transition Range	2956 acres	0 acres
Winter Range	4785 acres	1207 acres
Total	8381 acres	1890 acres

APPENDIX E

Road Analysis Summary

This Appendix is a summary of the Road Analysis process that the Sisters Ranger District interdisciplinary team used to assess resource and road conditions, and to develop a set of recommendations to inform the decision-making process for the Metolius Basin Forest Management Project environmental analysis. The Road Analysis itself **is not** a process that follows the National Environmental Policy Act (NEPA).

Background and Introduction

On January 12, 2001, the Forest Service adopted the final National Forest System Road Management Policy. The final rule removes the emphasis on transportation development and adds a requirement for science-based transportation analysis, consistent with changes in public demands and use of National Forest resources. The final rule is intended to help ensure that construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; that unneeded roads are decommissioned and restoration of ecological processes are initiated; and that additions to the National Forest System road network are only those deemed essential for forest resource management and use.

Roads analysis is a six-step process that provides a set of possible issues and analysis questions for which the answers can inform choices about road system management. The six steps in the roads analysis process are:

1. Setting up the analysis
2. Describing the situation
3. Identifying the issues
4. Assessing the benefits, problems, and risks
5. Describing opportunities and setting priorities
6. Reporting

The full Road Analysis Report is available from the Sisters Ranger District, and is a part of the Project Record for this analysis. Results are summarized in this appendix.

STEP 1: SETTING UP THE ANALYSIS

This roads analysis was completed on the project scale, instead of at the watershed scale, because of the immediate need to address roads within the project area in conjunction with the current environmental analysis, and the limited resources (personnel, time, funding and information) available to address roads at the broader scale. The Metolius Basin Forest Management project area covers approximately 17,000 acres. The road analysis area extends beyond the project boundary area as needed to address level 1 and 2 roads that occur both within and outside the project area.

The main objectives of this road analysis are:

- Identify the need for changes by comparing the current road system to the desired condition
- Balance the need for access with the need to minimize risks by examining important ecological, social and economic issues related to roads
- Address future access needs, budgets, and environmental concerns
- Address mitigation for vegetation and fuel treatments proposed under the Metolius Basin Forest Management Project

STEP 2. DESCRIBING THE SITUATION

See the Metolius Basin Forest Management Environmental Impact Statement, Chapter 3, under “Roads” for a description of the existing conditions.

The district road manager drove most of the open road miles in the project area to verify conditions and identify maintenance and construction needs. However, when local residents reviewed the preliminary road maps, several errors and omissions were identified concerning road status, use or location. The Friends of Metolius organization collected additional data and used GPS to update some road information. This information was added to the analysis, including approximately 2.25 additional miles of open roads, 1.3 additional miles of closed roads that had been breached.

STEP 3: IDENTIFYING ISSUES

Using information on watershed and resource trends, and management goals and direction from the Deschutes National Forest LRMP, the Northwest Forest Plan, Metolius Late Successional Reserve Assessment, and Metolius Watershed Assessment, and input from the public and agency resource specialists, several issues were identified that related to managing the transportation system in the Metolius Basin project area. The primary issues identified are:

- Resource Protection and mitigation of proposed vegetation and fuel management actions
- Public Access to National Forest lands
- Administrative Access to National Forest lands

STEP 4: ASSESSING BENEFITS, PROBLEMS AND RISKS

The purpose of this step is to assess the various benefits, problems, and risks of the current road system and whether the objectives of the Deschutes National Forest LRMP, the Northwest Forest Plan, Metolius Late Successional Reserve Assessment, and Metolius Watershed Assessment are being met.

The agency guidelines (USDA Forest Service, 1999) for completing the Road Analysis Process included a series of questions for planning teams to consider when identifying benefits, problems

and risks of the current road system. Response to all of the questions can be found in the full Road Analysis Report. A summary of the findings follows.

Ecosystem Functions & Processes

Questions about ecosystem functions and processes addressed potential effects of introducing non-native species and disease, noise, and disturbance patterns.

Forest habitats in the Metolius project area were identified as regionally significant for late-successional species and managed as a Late-Successional Reserve under the Northwest Forest Plan. The primary concern about the effect of roads on the ecosystem processes and function is their role as vectors along which non-native plant species are spread. Weeds are increasing along both the Metolius River and roads. Once established, seeds are spread along roadways by tires, animals, wind, and overland flow of water. Roads are not expected to facilitate the introduction exotic animal species in the project area.

A road system that meets the needs for managing timber would adequately contribute to the control of insects and diseases. However, roads can affect the rates of flow of disturbances such as floods. Most roads in the project area are low speed, so noise levels are relatively low.

Aquatic, Riparian Zone, and Water Quality

Questions in this section addressed a variety of potential watershed and wetland effects such as erosion and sedimentation, pollutants, and stream crossings.

In general, roads can alter the surface and subsurface hydrology of an area by altering natural channels and runoff patterns. Fortunately, much of the project area is relatively level, and this shallow slope helps minimize impacts from erosion and overland flow. There is some localized evidence of roads/water interactions in the project area. Road-stream crossings with culverts can increase sediment levels and result in erosion and waterflow on road surfaces. Roads can also facilitate stream contamination from pollutants such as de-icing salts, fertilizers, oils, and hydraulic fluids from vehicles.

Terrestrial Wildlife

Forest roads originally constructed to facilitate logging now facilitate numerous types of recreation. An increase in roaded recreation has resulted in an increase in wildlife disturbances, increased stress, and resulted in loss from legal and illegal hunting. Roads can result in the direct loss of available habitat and reduce habitat effectiveness for many wildlife species. Habitat can also be lost as a result of activities such as firewood collection.

Many roads within the project area are concentrated in special or unique areas. Some have resulted in the separation of streams from their floodplains and created barriers to dispersal. Road inactivation and closures, especially in sensitive habitat areas, can help the district meet Land and Resource Management Plan restoration goals.

Economics

Road costs and revenues are affected by the size of the road system. Revenues associated with roads include timber sales, recreation fees and special-use permits. Costs include resource restoration and road maintenance; at present costs exceed revenues. Long-term maintenance costs can be reduced with a reduction in the miles of open roads.

Commodity Production/Timber Management, Minerals and Range Management

The current road system was developed to provide access for resource management, including timber production. A reduction in roaded access to stands which require mechanical maintenance would increase the cost of future silvicultural treatments.

Currently there are no mineral developments or active range allotments in the planning area; there is one special use permit for grazing for horses.

Water Production

There are numerous irrigation ditches in the project area; many of these are not under special permit because they pre-date the special use permit authorization of the Deschutes National Forest. Roaded access to the ditches can help facilitate maintenance; the ditches are mostly in upland areas where the rate of vegetation growth is relatively slow. Road changes would not be expected to affect municipal watersheds or hydroelectric power generation.

Special Forest Products and Special Use Permits

The existing transportation system meets the need for current special forest product collection activities. These products include mushrooms, dry decorative cones, cedar boughs, and Christmas trees. Most of these products are not easily transported by hand for any distance, so it would be important to maintain adequate access to collection areas.

Firewood collection is not presently permitted except for collection of dead and damaged trees under 8" diameter on National Forest lands adjacent to private property. However, there is high potential for firewood in areas with small trees damaged by ice storms. Allowing firewood collection could help meet project objectives by reducing concentrations and densities of small trees.

Special use permits have been issued for summer homes, access to subdivisions and other private lands, utilities, ditches, and other facilities associated with the Camp Sherman area. Most of these permitted uses require roaded access, and current roads are adequate.

General Public Transportation and Administrative Use

Access in and out of the project area is primarily provided by arterial roads 11, 12, and 14 and collector road 1216. Other collector roads in the Camp Sherman area also provide access to private land and recreation. All these roads are maintained in accordance with their prescribed Road Management Objectives.

The existing road system is adequate to provide access to research projects, forest inventory, and monitoring activities. However, it also allows for present and future illegal activities such as trash disposal and poaching. Closure would decrease opportunities for these activities.

Protection

The current road system in the project area provides adequate access for fire suppression and forest management activities. System roads can act as fuel breaks for prescribed fires and low-moderate intensity wildfires.

Current conditions in the project area (fuel types, dense stands, heavy surface fuels) indicate the potential for high intensity, rapidly spreading wildfire. Fuel reduction along roads is critical to meet firefighting and public safety objectives.

Unroaded Recreation

The demand for unroaded recreation is expected to increase as the population of Central Oregon grows. However, within the project area there are no large blocks of unroaded areas or Inventoried Roadless Areas.

Road-related Recreation

The existing road system provides adequate access to developed and dispersed recreation, trails, and the Metolius River. There is not expected to be an increase in demand for new roads. However, current dispersed recreation use in riparian zones has resulted in impacts to natural resources. Proposed changes would reduce vehicle travel within riparian areas and would help these areas recover.

STEP 5: OPPORTUNITIES AND PRIORITIES

Problems and Risks Posed by the Current Road System

Resource specialists on the Sisters Ranger District reviewed each of the mapped and recorded roads in the project area, incorporated information from the Friends of Metolius, and evaluated the potential risks to resources and public access needs. The team worked in an interdisciplinary fashion to discuss each of the road segments, and then, based on risk and need assessments, recommend a course of action to meet area objectives.

Table 2-6 in Chapter 2 of the Environmental Impact Statement displays the road segments in the project area, and risk assessment by resource, public needs assessment for each road, and then a recommended changes to road status, if any.

Recommended Priorities for Action

The highest priorities for closure (either decommissioning or inactivation) are listed below.

Table E-1. Road Management Priorities for Addressing Resource Impacts

Forest Road Number	Rationale	Recommendation
Water Quality/ Soil, and Fish Habitat Risk		
1120800	Moderate to heavy surface erosion	Maintain (install waterbars and drain dips)
1200360	Breached road (previously closed). Receiving off-road vehicle use. Rutting and erosion evident	Decommission or inactivate
1200350	Receiving off-road vehicle use. Rutting and erosion evident. Peck's penstemon and tall agoseris are present. Also, deer winter range	Decommission
1200359	Breached road (previously closed) crosses Jack Creek. Receiving off-road vehicle use. Rutting and erosion evident	Decommission
1216100	Road in poor condition, resulting in minor erosion. Used as dispersed camp site	Maintain (install 5 drain dips), or inactivate
1420160	Road runs along the bottom of a draw, acts as a channel during overland flow. Recommend	Decommission
1420240	Breached road (previously closed) causing erosion adjacent to Jack Creek (Bull Trout habitat)	Decommission
Wildlife Habitat		
1200130	Spotted owl core and nesting, roosting, and foraging habitat	Decommission
1200140	Spotted owl core and nesting, roosting, and foraging habitat	Inactivate
1120150	Sensitive Meadow Habitat	Decommission
1200120	Spotted owl core and nesting, roosting, and foraging habitat (also crosses the riparian reserve)	Decommission
Social Impacts		
1400049	Currently access for unauthorized motorized access to Black Butte trail system	Inactivate

APPENDIX F

Response to Comments and Agency Letters

A. Introduction

A 67-day comment period was provided for interested and affected publics, including appropriate local, State, and Federal governments and agencies. This period lasted from December 11, 2002 until February 15, 2003. During this period, the Forest Service received a broad range of comments from many sectors of the public. As discussed in the Record of Decision (ROD), comments were incorporated into the decision by the responsible officials. Some comments resulted in a clarification of the alternative descriptions, treatments, or the environmental consequences discussed in the DEIS. Comments also resulted in modifications and clarifications to the Selected Alternative, as described in the ROD. Ultimately, the responsible officials weighed the comments in the context of the benefits of meeting the project purpose and need.

Approximately, 160 separate pieces of mail were received during the comment period. Comments were categorized into general categories that coincide with the resource areas that are outlined in the Final Environmental Impact Statement (FEIS). This comment appendix is formatted to address the public comments in the same order as presented in the FEIS (Table of Contents, Chapter 4).

Although all comments received were reviewed, substantive comments received the focus during this comment analysis. A few comment letters were received after the end of the comment period. Although not required to consider these comments, the planning team reviewed them and responded to those comments that had not already been given a response.

B. Comments and Responses

As part of the comment analysis, each piece of correspondence was assigned a reference number. As comments were identified within each piece of correspondence, a second number was assigned. For example, comment number 159-2 represents the second comment taken from letter number 159. These numbers have been used throughout the comment analysis to assure comments receive a response.

Once a comment was identified, it was placed in a category. Generally, responses were developed to answer questions or provide references to analysis contained in the Final Environmental Impact Statement FEIS or other documentation. Although the majority of the questions were addressed in the draft, the references have been updated in this document to refer to the appropriate pages in the FEIS. Comments may have been answered singly or in groups, with the aim being to provide as specific a response as possible, while avoiding a large amount of

duplication of responses. Numerous comments were received that were very similar in nature, resulting from information provided through internet campaigns from interested publics.

This Appendix offers a large sample of comments in order to provide an accurate flavor of the input received. However, this document does not provide a complete list of comments. The project file includes the comment letters, as well as a list of comments and the categories into which they have been placed. Comments are presented in bold type and are in italics. Each comment is indented and followed by the reference number(s). The Forest Service response immediately follows each comment or group of comments.

The vast majority of the comment letters were complimentary of the district and the overall public involvement efforts associated with this planning effort. There was also an overwhelming support from the public for some level of action in the Metolius Basin. Only one comment letter was received that advocated the No Action Alternative.

Alternatives

Numerous comments were received that expressed a preference for an individual alternative with a rationale for that preference. Some examples of these comments are presented below to provide a general feel for the variety of public opinion on the alternatives.

Alternatives 2, 3, 4, and 5 are nothing more than a scam to log this area again. You do not save a forest by cutting down that same forest. Alternative 1 is the best alternative for the Metolius. This basin is no more of a fire hazard now that it was 50-60 years ago. It has always been a high fire potential – nothing has changed. (128-2)

Alternative 2 is the best choice for reducing fire risk and increasing habitat of old-growth dependent species. (32-3, 33-1, 35-1, 45-1, 46-2, 47-1, 53-1, 61-1, 65-1, 66-1, 68-1, 71-4, 74-1, 76-1, 78-1, 80-1, 84-2, 119-1, 126-6)

I support and encourage the district to choose Alternative 2 because it would reduce the high density of smaller, more highly flammable trees through prescribed underburns, and it would limit thinning of trees larger than 12 inches dbh. Actually you don't even need to remove trees as large as 12 inches; 8-inch dbh trees would be enough to achieve your stated goals. (64-2)

Our judgment is that Alternative 3 would be most likely to achieve the aims we hold for the management of the Metolius Forest. We would like to see the 16" diameter at breast height (dbh) maximum as serving to maximize the retention of the big trees that we have left while allowing necessary reduction in the number of trees and density of vegetative cover. However, we want to be sensitive to your need for some flexibility in carrying out a management plan and to the forest's need to have recognized the realities of site capacity, wildfire behavior, and insect and disease impacts. We support a goal of sustainability. (30-2)

We would argue for a choice of Alternative 3 Plus. This would mean that you limit the removal of trees to a maximum of 16' dbh, except in those extraordinary circumstances that would be narrowly and precisely specified in a set of criteria. (72-3)

I support Alternative 4, I live in the Metolius Basin and see every day the condition of the forest. I believe Alternative 4 does a good job of addressing the need to restore the health and sustainability of the Metolius Basin Forest while protecting the area from catastrophic wildfires. (130-1)

I support your preference for Alternative 4. I agree that some reduction in the stand and crown densities is needed and preferable along with the reduction of surface fuels. I also agree that you should have the flexibility to remove trees up to 21" dbh, with the understanding that the removal of trees within the 16" to 21" range will be limited. (146-1)

Given that the primary goal is to reduce the risk of wildfire across the landscape, Alternative 5 seems to be a better choice of actions to accomplish that goal. The stated focus of Alternative 5 is to "maximize risk reduction across the landscape". Given your project goal, why chose anything less than actions that "maximize"? (63-1)

I endorse Alternative 5. I like it because it has the largest acreage of treated land. It includes shelterwood and larch restoration; and includes the option of removing some trees 21 inches or greater. It is very important not to place an artificial barrier on the size of a tree that can be removed. (15-1)

Although no response is provided directly to comments that identified a preference for an alternative, the concerns expressed are addressed in the response to comments that follow.

Vegetation Management in Late Successional Reserves

Comment: In the general landscape, all saplings (5" diameter or less) should not be removed. Leave well spaced young trees for future regeneration of the stands. (15-2)

Comment: Wherever thinning is done (even in Defensible Space Areas); a concerted effort should be made to protect well spaced, thrifty crowned large saplings and pole sized advanced reproduction. They are the key potentials for a continuous forest if the older generations fail (blow-down, insects, etc. (52-7)

Response: Not all small trees are intended to be removed. The diameter limits described in the document are not meant to imply that all trees under the diameter limits will be removed (FEIS, page 41). Forested stands are variable and contain patches of smaller trees. Silvicultural prescriptions are designed to recognize variations in tree size and the habitat requirements of the wildlife species being emphasized. Some dense pockets of smaller trees will be thinned to promote the health and vigor of the remaining trees and reduce fire hazards, but will not be completely removed. Saplings will be left as needed to meet wildlife habitat objectives and as replacement trees for declining large yellow-bark trees. Mitigation measures have been identified that will help maintain within stand diversity. For example, the FEIS calls for the retention of hiding cover for big game across the landscape (FEIS, p. 65). This will provide for untreated patches between ½ to 6 acres or larger throughout the area.

Comment: In the DEIS there is a heavy bias toward cultivating a pure Ponderosa with occasional stands of Western Larch. Both the DEIS and the discussions we have had with Forest Service personnel seem to favor virtual elimination of all true firs. Alternatives 3, 4 and 5 are also consistently biased against Grand fir (93-3, 104-5)

Comment: Page 217 of the DEIS states remove true fir and fulfill by large pine or other desirable species. What are other desirable species and why? If fire had burned through these areas in a natural way, what species would have come in? These should be the desirable species. (149-16)

Response: Not all white fir trees are planned for removal. Vegetation treatments for the Metolius Basin have been developed to recognize the historical influence that fire has had on stand development. Fires influence the numbers of trees and the species present through frequent, low intensity ground fires for both the ponderosa pine and mixed conifer plant associations (FEIS, page 117). True firs are intolerant of fire and its relative percent of stand composition has increased through time (FEIS, pages 110,204-205). Under natural disturbance regimes, stands had a higher relative composition of ponderosa pine, western larch, and Douglas-fir, which would be the more desirable species. Treatments are, in part, designed to emulate the role that natural disturbance regimes would play to help move the area to a more stable, sustainable condition (FEIS, page 115). The intention is to preserve a more natural and sustainable species diversity that recognizes the minor tree species components such as Engelmann spruce, white pine, lodgepole pine, and incense cedar, though some removal may occur to meet the purpose and need of the project.

The Metolius Basin identified 4 different objectives for stand treatments that are based on habitat requirements for the focal species, location, and current stand conditions (FEIS pages 24-27 and 42-43). White fir would be retained under the Selected Alternative when it is greater than 25" diameter (ROD, page 15), where it would help meet target basal areas (FEIS, pages 43-44), and to meet focal species habitat objectives (northern spotted owl habitat).

Comment: Too much biomass and shrub removal through thinning, commercial logging, underburning, and shrub mowing across the landscape eliminates biodiversity, reduces moisture retention, impairs nutrient recycling and potentially threatens soil fertility, soil productivity and water quality. All action Alternatives propose too much uniform biomass removal. (104-3)

Response: Chapter 4 of the FEIS addresses effects on plants, animals, soils, and water quality. One of the main objectives of the project is to move the majority of the Metolius Basin's forests to more sustainable conditions, similar to conditions that were found prior to excluding fires. By doing this, the risk of catastrophic wildfire, which could have drastic effects on soil fertility and water quality, will be reduced.

Historically, these sites saw fire on the average of every 8-12 years (FEIS, page 16). After thinning, tree densities would be reduced, but sites would still be fully occupied by trees. After mowing and/or burning, shrubs would be reduced, but this growing space would be utilized by grasses and forbs. Sensitive plants are expected to respond favorably to underburning and reductions in canopy cover of trees.

Within treatment units, areas of un-mowed shrubs (10-30%) would remain post-treatment. Clumps of un-thinned and/or lightly thinned trees would also remain. Large areas would also be left untreated or managed at a low intensity for spotted owls and goshawks, adding diversity to

the landscape. Larch, aspen, and meadow treatments will also help preserve the diversity on the landscape.

Comment: Forest Service approved logging over the past 75 years caused the present condition here, not fire prevention. Don't you know when you log and open up the "canopy" you are enabling the weeds, underbrush and young trees to proliferate into uncontrollable thickets? (128-3)

Response: The FEIS discusses the historical role of fire in Chapter 3, pages 116-123 and its role on the development of forested stands and the understory. Currently the forests in the project area have missed 7-10 fire cycles which has resulted in an increased risk that surface fires would become catastrophic stand-replacing wildfires. See the section on plants for discussion on the effects of the action alternatives on weeds.

Comment: Whatever alternative is finally selected, the area along the bike path from the Camp Sherman Community Hall to the Chapel in the Pines and all of the Holzman lease area is desperately in need of treatment. This area lies in the heart of Camp Sherman and must be restored for forest health, fuel reduction, and visual considerations. (134-4)

Response: The area described was recognized as needing treatment to reduce fire hazard and improve forest health, and is proposed for treatment in all of the action alternatives. Underburning would occur in Alternative 2, and thinning would occur in Alternatives 3, 4, and 5 (FEIS, Chapter 2, Maps of the Alternatives, and APPENDIX A, Silvicultural and Fuel Treatments). The Selected Alternative also incorporates some larch restoration in this area (ROD, Table ROD-1).

Comment: Fire suppression since the early 1900's has clearly taken the Metolius Basin far outside its normal natural operating condition. Therefore, the ORCFFF believes it is acceptable to conduct management activities in the Metolius Late-Successional Reserve. The Environmental Impact Statement actions should be one time, after which natural functions, including fire, should be embraced and depended upon to further refine and maintain future Late-Successional Reserve health. (148-2)

Comment: Try to duplicate nature, allow natural processes to proceed, to try to put it all back the best we can to where it might have been without human interference. (149-2)

Comment: Are we trying to make the tree configuration so we can defend against some fire at some point in time, or so we can more represent what would have more naturally been here tree-wise on the landscape, while also favoring those large ponderosa pines. (149-4)

Response: Part of the objective for the project is to move the area closer to a more fire-resilient condition by moving toward the historic stand densities and species composition that would occur under a low severity fire regime (FEIS, page 232). Treatments will reduce the potential for larger scale fires that have more severe effects. Many of the proposed actions, including reducing stand densities, mowing, and prescribed burning have a direct effect on enhancing sustainable conditions in fire-climax stands. The areas treated will be better prepared for effective reintroduction of the fire process over the long term. The reintroduction of fire will help maintain species composition, stand densities, and stand variability more closely to that which would be naturally occurring.

Comment: “Inquire whether your analysis has adequately differentiated the eastside Ponderosa stands from the mixed conifer stands”. The DEIS doesn’t translate sufficiently into on-the-ground differentiation for us lay people. (30-3)

Comment: Need more detailed information on each of the 400 stands, including detailed maps with prescriptions, sizes and ages of all trees present, all roads, trails, driveways, fire history of each stand (149-1)

Response: Pages 101-104 of the FEIS identify the plant association groups found within the Metolius Basin. These groups are combinations of individual plant associations and represent areas of similar climax species, site potential, and temperature/moisture regimes. These plant association groups were important considerations in helping to determine historic conditions and natural potential for the stands within the basin. This information coupled with current vegetative condition, historic disturbance regimes, current potential for fire of elevated severity regimes, and focal species habitat objectives were considered in identification of treatment areas and the type of treatments prescribed. More detailed maps and stand exam information are part of the project analysis file.

Comment: Discuss canopy closure percentages that exist now and are proposed for the future. The Environmental Impact Statement should articulate if prescriptions include canopy reduction goals and a strategy to achieve these goals in compliance with the intent and direction of the Northwest Forest Plan, the Project’s Desired Future Conditions, and habitat support for ESA listed species. (160-12)

Response: The planning area was divided into 4 habitat areas where specific focal species would be managed, consistent with long-term sustainability of habitat. Pages 131-132 of the FEIS contain information that discusses the acres of habitat for spotted owls. Nesting, roosting and foraging habitat (NRF) is defined by canopy cover greater than or equal to 40% and at least 5% among trees >21” in diameter. Approximately 7% of the planning area or 1,059 acres of NRF currently exist within the planning area. Treatments proposed under the Selected Alternative in NRF habitat include defensible space, aspen restoration, thinning trees <8” dbh, thinning trees <12” dbh, and underburning. These treatments will remove constituent elements of habitat, primarily the mid and lower story components and will result in 889 acres of suitable habitat (Wildlife Biological Evaluation, Page 38). Dispersal habitat and connectivity include stands that exceed 30% crown closure. Currently 62% of the planning area meets this definition. Post treatment approximately 2,045 acres would remain as dispersal habitat within the planning area. The Selected Alternative includes a slight modification to canopy closure within dispersal habitat in the designated connectivity corridor. Where 30-40% currently exists, we will maintain it at those levels as opposed to allowing it to be thinned down to 30% as called for in Alternative 3 (ROD, page 19).

Comment: The Forest Service must emphasize that the LSR in the Metolius is not sustainable as if it were a “dense, interior forest.” The NFP recognizes this and any attempt to appease this very small number of people will lead to a project that won’t meet goals of protecting habitat, property, and lives over the long-term. (114-3)

Response: Page 115 of the FEIS contains a discussion of sustainability. It is recognized that alteration of historic disturbance processes can result in a catastrophic change in the system, or an unsustainable or unstable condition. The discussion further points out that much of the old-growth habitat within the Metolius Basin project area is not stable, due in part to a long absence of low intensity fires. Current stand densities, recent droughts, and subsequent epidemics of

insects and disease have put tremendous stress on these forest stands, and some are now rapidly declining.

Comment: Special protection and treatment should also be accorded the old-growth stand directly west across Road 1425 from the entrance to the House of the Metolius. To the SFPC's knowledge, this old-growth stand is the largest intact old-growth ponderosa pine stand remaining on the flats of Road 1420. We presume from the Environmental Impact Statement maps that the Forest Service intends to do an underburning of this stand with no thinning of old-growth trees. We also assume that some thinning of small trees and raking of duff will occur around the old trees prior to any burning. (159-4)

Response: Under the Selected Alternative, the stands west of the entrance to the House of the Metolius are proposed for thinning trees up to 16 inches in diameter and underburning, with the exception of stand number 58375 which is proposed for underburning only. Thinning of small trees would also occur up to 8 inches dbh. Efforts will be made to protect large trees during burning activities. Most prescribed burning will occur during the spring when moisture levels are higher and burning will result in low intensity burns. Raking of bark berms around old pine trees could be carried out with the assistance of volunteers, if available.

Comment: Several comments were received that felt that shelterwood or more intensive treatments are essentially clearcuts, leave too few trees per acre, are inconsistent with the purpose and need, or are inconsistent with LSRA goals and objectives. (16-1, 96-5, 114-10, 128-11, 138-6, 141-8, and 149-6).

Response: Shelterwood harvests were included in Alternative 5 and are not part of the Selected Alternative (ROD). One letter identified larch restoration as a "clearcut" treatment. Larch restoration will result in some small ¼ to 3 acre openings and has been incorporated in the Selected Alternative. Openings of this size are within the range of those that would occur naturally on the landscape. Larch treatments have been incorporated into the Selected Alternative. The ROD indicates that lessons learned after a few group openings are implemented will be considered before proceeding with the remaining openings (ROD, page 12). Additional discussion on larch treatments is included below.

Comment: Several comments were received in support of treatments designed to restore aspen, meadows, or dwarf mistletoe treatments. (30-5, 72-4, 82-3, 134-6)

Comment: I look forward to the meadow restoration work. I assume that Allingham meadow is part of this plan. It is a classic case of the lack of fire allowing the establishment of many trees across a formerly open space. (86-4)

Response: These activities are prescribed under all the action alternatives including the Selected Alternative.

Comment: One issue that concerns me is "larch restoration," which I understand is being considered as an attachment to any implemented alternative. Why is this included in a "fire-hazard fuel load" reduction plan? (49-3)

Response: The purpose and need of the Metolius Basin Vegetation Management Project includes forest health objectives as well as reducing the risk of wildland fires. The object of the larch treatments would be to restore or re-grow declining larch stands, which provide important habitat and visual diversity in the predominately pine forest (FEIS, page 44).

Comment: The Service supports the larch restoration component of Alternative 5. Of particular concern to the Service will be maintaining important owl dispersal areas between owl clusters east-west and north-south. (122-3)

Comment: In the Larch Restoration Areas described on Page 15 of the summary EA the large larch overstory heavily infected with dwarf mistletoe must be cut if we are to have young healthy larch for future generations of trees and people. (52-3)

Comment: We suggest that you designate in your preferred alternative some limited places (maybe along Allingham Road) where you would do pruning for dwarf mistletoe and thin to enhance larch restoration. (30-5)

Comment: We are in favor of larch restoration as described in Alternative #5 implemented in areas north of Road 1216 and south of Road 1217 in the First Creek area. Our understanding is that the larch restoration treatments would not be as severe visually as what exists on the Metolius Heritage Demonstration Plot 1a. If this is the case, then we would entertain expanding larch restoration to the Holzman lease area as well. We do not endorse larch restoration as per Demo Plot 1a along the 1419 Road from Four Corners to the Camp Sherman Bridge. In our opinion, a mixed conifer thinning treatment as per Demo Plots 1a and 1b would be more appropriate visually at the Four Corners, assuming such treatment has merits silviculturally. (134-3)

Comment: P. 43 Larch Restoration - exactly where would 1/4 to 3 acres openings be created for larch? Those are large clearcuts that would take years to have trees fill in. (149-7)

Comment: I am in favor of a larch restoration program. I am concerned that alternative 5 approach is too aggressive [e.g. 3-5 acre group cuts] over a large area. I would urge an evolution from Friends of the Metolius' Heritage Demonstration Area [Plots 1a/1b]. (156-4)

Comment: Larch restoration – will it be as aggressive as Larch restoration Demo unit 1 and 2? (166-8)

Comment: There is no scientific evidence to show clearcutting "helps" larch populations - when past logging caused their decline - so NO to larch "restoration" openings. (21-6)

Response: The Selected Alternative includes approximately 735 acres of Larch Restoration treatments that are described and analyzed in Alternative 5 in the FEIS. The larch restoration treatment actually consists of two treatments. Most of the area (~70-90%) would be thinned from below, such as was done in Metolius Heritage Demonstration Project Unit 2a and 2b (FEIS, Insert 3 and 4). The objectives in this area are to favor mistletoe-free larch and reduce crowding of larch, which is the most light-demanding species found in the Basin. The second treatment would be group openings of ¼ to 3 acres (~10-30% of the stands treated, but scattered across the treatment area), where conditions would be created for larch regeneration to occur.

Page 44 of the FEIS describes the treatments prescribed for the larch treatments. Photographs have been included in the FEIS (Insert 1) to demonstrate how these thinning treatments are likely to look. Residual healthy trees would be left and pruning of dwarf mistletoe would be

accomplished. Small group openings will reduce dwarf mistletoe overstory trees and will help regenerate the shade intolerant species by opening the stands up.

The ROD identifies the decision to implement larch treatments. Provisions have been incorporated into the decision to use the assistance of the Multi-Party Monitoring Team. The District will work with this team to monitor, discuss, learn and adjust to help the project be as successful as possible (ROD, page 20). Implementation criteria and guidelines will be developed by the District to help field crews and operators accomplish these in the field in the most acceptable, pragmatic and sensible way.

Comment: We have nothing against thinning and reducing ladder fuels around populated areas if it can be done in a manner which preserves, in the case of the Metolius Basin, the outstanding old-growth and other resources. (23-2)

Comment: The Environmental Impact Statement fails to specifically provide that existing old-growth is going to be protected by the removal of the young competition and ladder fuels around the old-growth trees...We want assurances that this cutting of the small trees around the old-growth will be done. (159-3)

Response: The FEIS discusses the effects of the action alternatives on late-successional/old growth structures (FEIS, page 208-209). Treatments are designed with the intention of reducing stand densities to promote the development of large trees and protect existing stand structure. The Upper Management Zone (UMZ) principal (see page 107 of the FEIS for an explanation of UMZ) was incorporated in order to evaluate the alternatives in terms of risk of severe insect or disease effects. Thinning prescriptions are designed to thin from below (i.e. smaller trees) and thereby reducing the competition stress associated with larger trees in the treatment areas. The acres of old growth stands treated by alternative is displayed in Table 4-4 on Page 218 of the FEIS. The Selected Alternative is expected to reduce the acreage of old growth stands that remain at high risk from 5,300 acres under No Action to 4,202 acres.

Comment: In the Ponderosa pine type, drought periods can explode endemic population of Western Pine beetle (Dendroctonus brevicomis) into epidemic proportions, especially in high density stand with high basal area (could be mass killings). Your Summary EA on Page 14 does an excellent job of describing the importance of Basal Area control. From my practical experience, 90-110 sq. ft. of BA is a good point to shoot for. Prioritize the cutting of small crown (low C&D) Keen Class 2, 3 & 4 trees and especially high risk trees with fading off color, yellowing, and many dying needles and branches. The training marked plot that I visited is a good example. Thinning in these denser older stands can also reduce ladder effect as related to fire spread as well as make more moisture available to those leave trees to survive for future generations. (52-2)

Comment: High density stands are at greater risk to be attacked by various species of bark beetle. Vegetation management (stocking level control) is a scientifically proven method for treatment and should be used effectively on this project. (111-2)

Comment: If we are too aggressive or presumptuous, people will have to live with decisions made in 2003 for a long time to get back in sync for 400 year old systems. These systems are supposed to have insects, disease and wildfire. Why do we suppose to know what the "best" prescription is? Why do we know what healthy is? Forests are always at risk to insects, disease, and wildfire. (149-3)

Response: The Selected Alternative does not presume to eliminate insects, disease, and wildfire. The underlying assumption for this project, which has wide support among scientists, is that by moving these interior pine and mixed conifer forests toward conditions more closely resembling the historic ranges of variability they will be more resilient to these natural agents of disturbance (FEIS, 112). The Selected Alternative would also maintain large areas at higher than historic stand densities in order to provide habitat for species associated with denser interior forests, such as spotted owls. In these areas, insects, disease, and wildfire will continue to operate at higher than historic endemic levels.

Comment: The NEPA Document did not fully incorporate the beneficial effects of insects. (155-25)

Response: The Selected Alternative does not presume to eliminate insects. It is recognized that insects play many beneficial roles in forests. However, their role must be viewed in a historic and landscape context. One of the main objectives of this project is to restore and reduce risk to late-successional forests, by reducing stand densities to more sustainable levels. For example, the Selected Alternative would reduce bark beetle activity in most pine stands, but not eliminate it. Snags would continue to be created by bark beetle attacks on weakened old-growth trees, albeit at lower, more historic levels. The Selected Alternative would also maintain large areas at higher than historic stand densities in order to provide habitat for species associated with denser interior forests, such as spotted owls. In these areas insects will continue to operate at higher than historic endemic levels, providing for large numbers of snags and down logs.

Comment: The EIS said you looked at 1953 air photos. Are there any other 1930 or 1940 air photos that you did analysis on to determine how many large, 21, 25 inch or whatever ponderosa pine per acre existed on the above stands before a lot of the numerous trees started to grow after fire suppression? Some of the 5-15 large trees per acre mentioned in the EIS in a historical context seem to be a very low number for stands that I am familiar with. (59-2)

Response: Historical numbers of large trees per acre were estimated based on many historical sources such as Munger (1917), land survey notes (1865-1899), stand exam data from the 1,400 acre Metolius Research Natural Area (established in 1934) where there is no evidence of past timber harvest, and Forest Conditions in the Cascade Range Forest Reserve, Oregon (1903) (FEIS, pages 104-105 and 116).

Comment: Are UMZ standards designed to meet scientifically-derived ecosystem requirements or do they reflect maximum production of trees for harvest as timber? We could trust decisions made to reflect what works best to perpetuate the old-growth character of the Metolius forest. We would not support management for tree farm results. (72-14)

Comment: We question the validity of the figures used to determine the UMZ regimes for various species, particularly ponderosa pine. There are stands of old growth trees where individual old growth trees are recommended to be logged under the UMZ concept, when all of the trees have been there in excess of 125-150 years and it is obvious that the biological carrying capacity of the land can sustain all these old growth trees. (155-3)

Response: UMZ (FEIS, page 107) is based on the concept described in the scientific paper, Suggested Stocking Levels for Forest Stands in Northeastern Oregon and Southeastern Washington prepared by P.H.Cochran et al (1994). The UMZ concept identifies the density level

at which a suppressed class of trees begin to develop. For ponderosa pine, this is the level beyond which there is imminent risk of catastrophic loss of overstory trees to bark beetles. As natural disturbance processes such as fire have been altered, stand densities have increased leading to increased competition for available light, moisture, and nutrients. The UMZ concept has been used in the Metolius Basin project to identify stands at risk. It is used as a measure to disclose the relative effects of the alternatives at reducing the overall risk of insects and disease (FEIS, page 107).

Comment: The need to thin the understory of overabundant fuels from years of fire suppression is obvious but I do not agree with the basal area assessment for targeting productivity of stands. There is no need to cut large diameter trees. The area is a late successional reserve and should be viewed as a natural area. (75-1)

Comment: I request consideration of my concern that all reasonable efforts be made to preserve old growth forests in Oregon and the National Forest. BLM and BIA administered land. (79-1)

Comment: Given that the project would be carried out in a Late Successional Reserve, created by the Northwest Forest Plan as areas set aside for the development of habitat for species requiring old growth conditions, Alternative 2 in your DEIS clearly advances those goals to a much greater degree than the others. The treatments prescribed by Alternative 2 such as mechanical removal of brush and small trees plus prescribed burns and road closures seem ideally suited to bring about a return of those conditions, with obvious benefits for wildlife adapted to them. (97-1)

Comment: It is important that active vegetation management is needed in late-successional reserves. The Northwest Forest Plan does allow for vegetation management activities to take place in Late-Successional Reserve areas. (111-6)

Comment: Further, I question how even "catastrophic" insects or diseases leave people at greater risk, so the "justification" for rejection Alternative 2 also seems false. "Mixed severity wildfires" are a natural part of the eastern Oregon landscape, and since all the alternatives adequately treat the areas closest to homes and humans, the fact that ALL fire risks can't be completely eliminated hardly provides reason for logging old-growth. (136-2)

Comment: It is inappropriate to allow logging of trees up to 21" diameter in a designated Late-Successional Reserve. The thinning from below is too vague. The desired basal density of 80 to 140 square feet basal area allows too much discretion for the contractor. (138-5)

Comment: All old growth trees, no matter their size, should be left. The preferred Alternative would cut old growth ponderosa pine, Douglas-fir, and western larch up to 21+" and 200+ years old. There are many old growth trees that are 14"-21" dbh that would be cut. All old growth trees, regardless of size and species should be protected. (155-1)

Comment: Because the old growth stands in the planning area are way below their historic range of abundance, it is not fitting to log any old growth trees at this time. (155-2)

Comment: In the short term, until the owls' traditional Westside habitat is more fully protected and recovered, the FS should err on the side of protecting the owl. There may be a slight tension between maintaining spotted owl habitat and fire regimes. The FS must ensure that its management activities enhance late successional conditions. (155-4)

Comment: The SFPC is very supportive of a forest management projects to reduce the number of small trees in the Metolius Basin because of the threat of a greater intensity of fire and the threat of competition from the small trees on the few remaining old-growth in the Basin. (159-1)

Response: The protection of large, old trees is a primary goal of the project. The Metolius Watershed Analysis and the Metolius Late Successional Reserve Assessment include recommendations and goals that are geared toward maintaining sustainable vegetative conditions consistent with the natural range of variability for Eastern Oregon Cascade province where vegetation developed under natural fire regimes (FEIS, page 17-22). The purpose and need identifies the need to reduce current fire risk and to help protect late-successional habitat, water quality, soil productivity, and scenic values. These values can be affected by extreme fire behavior as experienced in the 2002 fire season (FEIS, page 14, 117-119). The purpose and need also recognizes that 7-10 fire cycles have been missed in the ponderosa pine forests in the East Cascades, allowing decades of vegetation to accumulate which has lead to non-sustainable stand conditions that exhibit unnatural densities. These stands are proposed for treatment to help reduce the risk to large diameter, older ponderosa pine trees which are at imminent risk to insect, disease or wildland fire (FEIS, page 16). Silviculture prescriptions are designed to thin from below (FEIS, page 40-44) and are designed to retain the healthiest and largest trees. The use of the focal species concept provides for maintaining a diversity of forest conditions that would maintain habitat for spotted owls and benefit species such as the white-headed woodpecker that has lost habitat through time. Alternative 3 has been identified as the Selected Alternative with some minor modifications to the size of trees removed (ROD, page 14-15). The environmental consequences section (FEIS, Chapter 4) has fully analyzed these effects and demonstrate the trade-offs that will be associated with the decision (ROD).

Comment: I'm not sure how for a higher residual density of 120-140 square feet basal area, then lower residual density of 80-100 square feet basal area, both could be managed for open, mature stands with healthy ponderosa pine. If this amount of higher basal area can be "healthy", why couldn't more of the 14,000 acre project area be managed for this except for the additional desire of wanting diversity for goshawk, spotted owl, or white-headed woodpecker? (149-5)

Response: The post-thinning stand density objectives are based on desired habitat conditions for the focal species for which areas are identified to emphasize (FEIS, page 27). Pages 40-44 of the FEIS describe the post-thinning densities and the objectives for each stand. The higher post-thinning density stands are designed to maintain or move stands toward goshawk foraging habitat, spotted owl nesting, roosting and foraging habitat; spotted owl dispersal habitat, or maintain spotted owl connectivity corridors. The lower post-thinning densities have objectives that would help maintain or create suitable white-headed woodpecker habitat, reduce fire hazard, or grow large structure on mixed conifer sites to move stands toward spotted owl nesting, roosting, and foraging habitat (FEIS, 43-44).

Comment: Is what's going on along Hwy 20 the same as one of these alternatives? (166-3)

Response: Alternative 2 of the Metolius Basin Vegetation Management Project is fairly similar to the Highway 20 project as it focuses on thinning smaller diameter trees and brush reduction.

Size of Trees Removed

Nearly 80 individual comments were received regarding the size of trees removed. Comments were highly varied and are similar to the discussion presented on page 203 of the FEIS. Some comments received expressed the concern for maintaining full flexibility in terms of addressing forest health objectives, while others expressed the concern that strict diameter limits are necessary to protect old growth. Numerous comments expressed a preference for an alternative with diameter limits, but felt it was important to maintain some flexibility to treat trees of larger sizes. The variety of comments received is reflected in the examples below.

Comment: Diameter limits should not be the criterion base for tree removal. Health, vigor, spacing, site class, etc. should be the deciding factors. To produce the desired old-growth characteristics and maintain it, you will need to do active vegetation management treatments. The Northwest Forest Plan, in east-side Late-Successional Reserve areas, does not state the use of diameter limits. We need to focus on what do we want left and not what we are removing. (111-7)

Comment: Among the issues considered in some detail in the Draft EIS are the diameter limits for tree harvest for the various alternatives. Although this is a sensitive issue for certain segments of the interested public, I urge you to favor management prescriptions that are based on your substantial silvicultural and ecological knowledge and experience rather than rigid limits that have no real scientific or empirical basis. (85-3)

Comment: It is very important not to place an artificial barrier on the size of a tree that can be removed. The science of forest health should prevail over the "social" decision to limit the diameter of a tree subject to management. (15-1)

Comment: We feel that the preferred alternative #4 does the best job of implementing the objectives of the Project. The basis for our selection of this alternative is that the upper limit of 21" dbh for trees that can be cut gives a sufficient amount of flexibility in optimizing stand treatments to meet the stated objectives. The field demonstration by USFS staff member Brian Tandy last January 18th, showing the comparative results between a 16" and a 21" diameter limit clearly made this point. Implementing Alternative #4 diminishes the likelihood of the need to return to the Project area for another major thinning and instead provides for follow-up under burning techniques to maintain the forest health conditions. (134-1)

Comment: The timber thinning treatments of Alternative 4 seem to approach the upper limit of what the general public would consider as desirable. Specifically, the maximum diameter of trees to be removed should be reduced toward the lower end of the range proposed. However, latitude on a site-specific basis, should be allowed for increased diameters where required to meet stand density, forest health and diversity objectives. (8-5)

Comment: Alternative 4 seems to be the best compromise of the various options, but I would like to see the marking crew have more flexibility that would allow them to cut larger diameter trees on a stand-by-stand basis as proposed in alternative 5. I believe this

would improve the quality of stands left, rather than just always preserving the larger diameter trees as a matter of policy. (142-2)

Comment: Setting the diameter limits at 16" diameter is a critical decision – maximizes the retention of the big trees that we have left while allowing necessary reduction in the # of trees and the density of the vegetative cover. However, o.k. to remove a few bigger trees in certain cases, particularly relating to removal of larger white fir in the ponderosa stands. (30-2)

Comment: Choose Alternative 3 plus. This would mean you would limit the removal of trees to a maximum of 16" dbh. Criteria for removing trees 16"-21" – hazard trees (retain as down wood); white fir; other species which display marked symptoms of ill health of decline; thinning for larch regeneration; favored species of Ponderosa, larch, and Douglas-fir only when all other options had been exhausted. Allow flexibility. (72-3)

Comment: Of the five alternative plans, I support alternative 3, albeit with some suggested modifications. Specifically, I believe that there is a need in several parts of the basin to remove trees larger than 16 inches DBH. There are areas that are so overgrown that removal of fairly large trees will be required. I don't necessarily object to this. But the difficulty lies in determining where larger trees should be removed, with a close watch on preserving old growth communities. With fairly well prescribed rules for tree removal, I'm sure that the Forest Service could figure out where there is a need to remove some larger trees. (81-2)

Comment: In general, the diameter limits proposed in Alternative three would seem to be very adequate to handle fire risk over most of the project area with the least impact on wildlife. This would also allow for further development of old growth forest in most of the area. In some specific areas, however this limit may well be too stringent, and removal of larger trees up to the Alt. 4 limit of 21" might be required. In these areas the criteria allowing removal should be narrowly defined as is done in the Friends on the Metolius response. (96-2)

Comment: Additionally, the Service recognizes the need to promote early seral species (e.g. ponderosa pine and western larch) by occasionally removing larger white fir greater than 21 inches in diameter where stands exhibit high mortality or high levels of insect and disease. (122-2)

Comment: The ORCFFF believes that balancing overall forest characteristics (e.g. size, basal area, stems per acres, tree and plant mix) is important than zeroing in on any one characteristic, like size. It was clear from the prototype stands that the upper limit on cut size (12, 16, 21, or 25 inches) was just that, an upper limit, and not an indication that all trees up to the limit would be cut. The ORCFFF supports the removal of larger trees where biologically justified. The ORCFFF does not support the harvest of larger trees for commercial gains. (148-3)

Comment: In mixed stands where there is white fir (a very tolerant and invasive short term species) there also should not be an upper limit for cutting in order to control spread of the species. Advocates who would thwart forest Service efforts to control risk and improve forest health in designated cancerous areas (as described above) by thinning with no specified DBH limit - should take this opportunity to join forces in this effort of true forest management. (52-5)

Comment: I feel that the 21" diameter limit is a taking of what I might refer to as old growth trees and wonder how necessary it is to remove trees of that size. (2-3)

Comment: Alternative #3 places the proper preference of handling the Big Tree component of the Metolius Forest. It should be amended though to provide for some Larch restoration and only very limited removal of trees in the 16" to 21" diameter range. Aspen and meadow restoration should be a priority as well. It is clear that removal of big trees beyond the scope of Alternative #3 is completely unjustified to achieve the goal of Forest Health Management and Fire prevention. (29-2)

Comment: I am concerned about the decision for logging in the Metolius River Basin. While I respect and thank you for the attempt to restore old-growth forests and wildlife habitat, I am concerned that cutting larger trees (up to 16-21+ inches) would be counterproductive and even damage the integrity of this area. (32-1)

Comment: All medium, large and old-growth trees and especially the ponderosa pine need to be left standing. Thinning should occur on only small diameter and clustered trees. Restoration and enhancement of the target area should be the priority and not commercially driven logging. We must wake up to the fact that old growth forests are extremely rare, and a method used to reduce fuels which also reduces medium, large and old growth trees is unacceptable. These forests must be protected, not used fuel commercial interests. (33-2)

Comment: If the Forest Service is serious about old growth Ponderosa pine restoration and catastrophic fire risk reduction, then under no conditions should it implement an alternative that allows for the cutting of trees as large as 21" dbh. This is ludicrous. Trees of 21" dbh are arguably the most important constituents of the Old Growth Forest; they are old growth, with all of the desired attributes of late-successional elders. (113-2)

Comment: Under all Alternatives, 4600+ acres would be thinned to a 12" dbh limit, which should help reduce fuels and help restore the forest ecosystem. We support this thinning and slash treatment with prescribed fire. Additional thinning from Alternative 3 would be supported by ONRC if a 12-14" diameter limit were used for pp, D-fir, and wl. (155-8)

Comment: It is my belief that Alternative #2 is the best option to reduce fire risk and increase habitat for old-growth dependent species. Old growth timber is currently below historic levels and all medium, large, and old-growth trees (esp. ponderosa pine) must be protected for wildlife and future generations. (31-1)

Comment: The "Preferred Alternative" seems to counteract two of the goals of the project to protect old growth and grow more scenic trees. To achieve these two aims one must not harvest the larger trees in the first place. Sixteen and twenty-one inch trees are most probably old growth already. There is not an overabundance of old growth in the basin as it is, so existing trees should be protected at the onset of the project. (98-2)

Comment: The Forest Service must respect the fact that, given the scarcity of large, old-growth dominated stands across the region, trees approaching the 21' mark must be given time to develop and mature into trees that will compliment and replace the existing older tree structure in the area. By setting these 16" and 21" standards, the Forest Service's Alternative 3 proposes to log the future of old-growth habitat in the area. (161-3)

Comment: The Forest Service should not be addressing the issue of “the socially acceptable diameter limit of trees that can be cut and removed...”The reliance on diameter limits is an expedient means to avoid conflict but creates more problems than it resolves. Furthermore, the Forest Service is not taking a professional approach and looking at all characteristics and stating up front what the desired future conditions are in scientific, measurable terms. The Forest Service must, at the project level, address the ecological objectives and not try to resolve long-standing policy issues. (114-1 and 2)

Response: Tree size was identified as a key issue during the public scoping process based on the intensity of public interest. An issue can be a point of discussion, debate, or dispute about the environmental effects associated with a proposed action. From the initial scoping to present there has been much discussion on this point. The range of alternatives that is presented in the EIS is designed with various tree sizes prescribed for removal. The environmental effects (FEIS, Chapter 4) are described for the resources that are affected by the size of tree removed and residual stand densities. The Selected Alternative includes a 16” diameter limit, with some level of flexibility for the removal of larger trees (as many comments suggested). These exceptions are described in the ROD.

Comment: Clarify the diameter limits that are actually being proposed under the action Alternatives. (Confusion between when the limit is 8 or 12” diameter). (122-6)

Response: Appendix A of the FEIS has a unit by unit listing that identifies stands that will be thinned up to 8” dbh. These include stands that are in the defensible space. The defensible space strategy is planned to reduce fuels along a contiguous corridor (with a variety of tree size and spacing) of 600 feet on either side of the main routes out of the basin, and along a 1200 foot area along either side of residential areas and other areas of high use. Additionally, treatments of this size class will be used in stands of high densities of small trees and in existing plantations. Stands identified for treatments that will remove larger diameters are identified and in Appendix A as well. These treatment areas have been identified based on forest health needs and have prescriptions that are designed to meet habitat conditions that are sustainable for a variety of wildlife species (FEIS, 39-45). Under all of the action alternatives, underburning treatments will allow for the thinning of up to 8” trees to allow flexibility for treatment prior to burning to help control fire behavior during prescribed burning.

Comment: The graph “which size of trees would be removed” is misleading. No data is cited as the basis of this graph. The project includes no mechanism to insure that is accurate. (138-3)

Response: The graph was presented to provide some general idea to interested publics of the relative percent of trees that would be removed under the alternatives (FEIS, page 43). It displays a general concept for the landscape. This information is based on the analysis of stand information for treatment areas and reflects the effect of thinning from below in selected stands. Silviculture treatments will focus on leaving the largest and healthiest trees as discussed on pages 40-44 of the FEIS. As the footnote to the graph states, “The actual percent of trees of different sizes removed from each stand would vary depending on stand conditions and the number of trees of different sizes within the stand.”

Comment: The policy-level issue of management of LSRs and size of trees removed was addressed when the NFP was written. Any attempt to supersede or modify this existing

direction by the Forest Supervisor in the Record of Decision would be construed as an amendment to the NFP. (114-3)

Response: Tree size is a key issue developed from project scoping and alternatives were developed to help provide a range of alternatives that would address this key issue. Treatments are designed within LSRs based on wildlife habitat objectives and are consistent with the Northwest Forest Plan (Alternative 5 does contain some shelterwood treatments that were not evaluated under the LSR Assessment) (FEIS, page 217). Alternatives that have been developed and analyzed in the Metolius project are project specific and are not an attempt to supercede or modify existing direction (ROD).

Comment: Maximum trees to be cut are up to 12, 16 and 21 inches. I know that stands vary a lot because of many factors, but do you have information on the ages of typical trees that are 12, 16 and 21 inches for some of the dry ponderosa pine stands that I am most familiar with? Basically, if fires started being suppressed in 1920s or 1930s, 70-80 years ago, and historically burned typically every 8-12 years, how old are those trees that now are 12, 16, and 21 inches? (59-1)

Response: A summary of information derived from the growth sample trees from the Metolius Basin area stand exams is displayed below.

Species	Average Age 8-12" diameter	Average Age 13-16" diameter	Average Age 17-21" diameter
Ponderosa Pine	71	87	139
White Fir	66	72	74
Western Larch	81	91	94
Douglas-fir	53	50	72
Incense Cedar	61	66	72

Comment: What is the need for "flexibility" on tree size in Alt 5 or any alternative? (166-7)

Response: The need for "flexibility" on tree size is related to the desired future condition of an individual stand. Treatment objectives have been identified for each stand. The treatment descriptions identify the need to reduce the overall number of trees and to provide for healthy more sustainable conditions on the landscape. Although reaching target basal areas will help address the desired stand densities, the diameter limits remove the flexibility in terms of making the smart choices between which trees are most desirable to leave. For example, alternatives that have diameter limits will prevent the ability to remove large diameter trees that are heavily infested with dwarf mistletoe (which affects future stand development) and can lead to the leaving a larger diameter tree that is perhaps 17" while removing a smaller (e.g. 15"), healthier tree to achieve overall desired densities. Stands with clumps of larger diameter trees will remain susceptible to bark beetles and will remain at risk of losing the large trees within the stand when diameter limits prevent the thinning of these clumps.

Comment: There should be no cutting of any old-growth yellow bark pine no matter the size of the trees. In some cases, such old-growth with an age of over 200 years can be less than 16" in diameter. On the other hand, the SFPC can support the cutting of white fir greater than 16 inches in diameter up to 21 inches. The SFPC does not expect that all white fir up to 21 inches would be cut, but where such trees threaten surrounding

ponderosa pine old-growth they should be removed. Consideration of diameters of trees is very appropriate for the scenic and recreation management objectives of the Heritage Area. The SFPC does not believe it is necessary to cut old-growth ponderosa pine of any size because such trees have clearly survived competition dating back over 200 years. The only new threat now is all of the younger trees which have grown in because of the suppression of fire. There is plenty of opportunity to reduce competition and reduce basal area by thinning the younger trees around the old-growth clumps. (159-2)

Response: The ROD identifies Alternative 3, which has a diameter limit of 16 inches, as the Selected Alternative. It incorporates some minor exceptions where larger diameter trees would be removed (e.g. larch restoration and white fir). A review of stand exam data shows that of the growth sample tree data collected, ponderosa pines 16" and under average less than 100 years. It is recognized that some smaller trees may be older. During thinning operations consideration will be given to leaving some smaller diameter but older (yellow-bark) ponderosa pine as a way to retain some of the genetic, visual and structural diversity these types of trees represent in the old growth ponderosa pine community (ROD, page 16). The ROD discusses allowing flexibility to implement this direction on the ground so the intent can be met while not overly compromising the purpose and need for the project or complicating the implementation of the project.

Comment: What size trees were taken in Unit 2 (Demo)? (166-9)

Response: Silviculture prescriptions called for thinning up to 21", as necessary to achieve management objectives. Unit 2 of the Metolius demonstration plots consisted of thinning the area to two different residual basal areas (90 square feet and 110 square feet). Inserts 3 and 4 of the FEIS show the before and after photographs of this demonstration plot.

Comment: Large trees are generally the most fire resilient and should remain on the ground (dead or alive). Alternative 4 and 5 would require an amendment of the applicable Forest Plan and a decision by the Regional Forester as these 2 Alternatives contravene the Eastside Screens (Regional Forester Amendment #2). (161-1)

Response: The Metolius Basin project area is covered by the Deschutes National Forest Land and Resource Management Plan, as amended by the Northwest Forest Plan (NFP) in 1994 (FEIS, page 19). Consistent with the NFP, Watershed and Late Successional Reserve assessments were completed (FEIS, pages 19-22). Consistency with the Metolius Late-Successional Reserve Assessment is discussed for the alternatives on pages 208 (No Action Alternative) and pages 220-215 for the action alternatives. The Regional Forester's Forest Plans Amendment #2 (Eastside Screens) do not apply to this planning area as it is west of the owl line.

Comment: My major concern is the size of trees removed, specifically those in alternatives 3 and 4. I have concerns about the upper limit size of trees that could be removed. Who makes the decision which trees to remove in a given area and how is that decision made? (2-1)

Response: The Forest Supervisor is the deciding official for the Metolius Basin Vegetation Management Project. The ROD identifies the Selected Alternative and specifies a diameter limit of 16" with some specified exceptions. Each stand selected for treatment has an objective for treatment. Site specific treatments identify the objectives for which and how many trees to leave in an individual units. The project silviculturist and implementation team provide the site specific details associated with implementing the Forest Supervisor's decision. Treatments would thin

from below and site-specific marking guides provide the guidance to the district marking crew for implementation. The ground decisions on which trees will be removed or retained is made by the marking crew under the direction of a certified Silviculturist.

Comment: How does this plan look forward to the Metolius forest in 2025, 2075, and 2100? Beyond? We don't find guarantees in the Plan for retaining the specimens of the old growth of the future. What are your intentions about leaving some trees of various sizes on every site to serve as the replacements for the trees that will eventually succumb to old age, disease, or insects? How do you instruct marking crews to achieve such a goal when you are thinning from below? (72-15)

Response: Most of the stands in the Metolius Basin are multi-aged/multi-storied, and would remain in this condition post-treatment. There would just be fewer trees in the smaller size classes. It is our intention to leave trees for replacement of the old-growth trees across the landscape. These trees are generally 30-100 years old and would be able to respond to increased growing space and eventually replace the older trees in the event of their death. Crews follow written marking and spacing guides, which call for the leaving of replacement trees around old-growth trees. The number being left depends on the current condition of the old-growth.

Most stands in the basin are non-uniform, with even-aged patches that in combination represent many age classes. So, thinning from below within these patches would leave a wide spectrum of age classes across the landscape.

Fire and Fuels

Nearly 100 individual comments were received that provided an opinion or question in relation to fuel reduction. Comments centered around reducing the risk of catastrophic wildland fire within the basin, the size of material that is necessary to remove to reduce fire risk, the defensible space strategy, the timing and priority of implementation, prescribed burning, and air quality.

The following samples demonstrate the variety of comments received about the reduction of wildland fire risk.

Comment: The Eyerly and Cache Mountain fires provide a sobering reminder of the urgent need to promptly reduce wildfire hazards in the Basin, as well as how these dynamic, fire-adapted ecosystems will require ongoing active management. My 20+ years of experience as a forest watershed specialist and working knowledge of relevant research and other information lead me to believe that the watershed impacts of severe wildfire far outweigh those of management activities like those considered in the Draft EIS. (85-1 and 85-5)

Comment: In the Conservancy's view, the proposed alternative (Alternative 4) provides the most progress toward restoration of late successional reserves and reduction of crown fire risk and the subsequent risk to life and property in Camp Sherman, The Conservancy recognizes that, in the frequent fire interval, ponderosa pine forest at issue here, the use of prescribed fire alone cannot safely or effectively meet fire reduction and restoration goals. Rather, pre-burn mechanical treatment is necessary in stands that are too thick to rely solely on prescribed fire. The ecological and safety benefits of reduced fire hazard and increased site productivity far outweigh any impacts of mechanical treatments. (88-1)

Comment: In the midst of all the beauty comes the annual fear of the return of "Fire Season". Although there have been several fires in our region recently, no one will soon forget the summer of '02. We, as well as a lot of the United States saw what a century of fire suppression has done to the health of the forests in this Country, as well as our immediate area. In addition, we have the added negative aspect of the snowstorm that caused so much damage to our area. (105-1)

Comment: I agree with the Draft that Alternative 4 would probably be the best alternative to implement. I have lived in Camp Sherman for 10 years and observed first-hand how unhealthy our forests are. I have seen photos of what this area was like 60 years ago. There is no comparison to the forests of those days. While we cannot bring back those forests in quick order, we can begin the foundation for restoring our forests' health for future generations. It would be a terrible shame and tremendous waste of resources to see it all burned to the ground in a wildland fire. But that is exactly what will happen if we do not begin actions for thinning and forest restoration as quickly as possible. (108-1)

Comment: During the last 15 years or so I have seen the forest in the basin get more and more dense. Numerous areas of the basin have many thickets of ponderosa, white fir, and lodgepole. Additionally, there are many blow-downs and snow-damaged trees. I am concerned that these very dense areas will harbor plant disease, promote unhealthy insect growth, and would be extremely difficult to fight in case of fire. Therefore I support aggressive thinning of the forests of the Metolius Basin. ... I therefore support "Alternative 4" in the Draft EIS. (140-1)

Comment: Clearly there is a need to thin some trees. It is enough to make a fire fighter's kid cringe. While I am not against thinning as needed, I feel we must also protect healthy older trees in the process. (22-1)

Comment: Alternative 2 is the best choice for reducing fire risk and increasing habitat for old-growth dependent species. (32-3, 39-1, 45-1, 53-1, 61-1, 65-1, 66-1, 68-1, 71-4, 74-1, 76-1)

Comment: Several comments were received that favored Alternative 2 "because of its focus on clearing brush, thinning small diameter trees, and using prescribed fire". They did not favor removal of larger diameter trees as proposed in the other action alternatives. Many expressed the belief that "Restoration should come first, not commercially driven logging." (33-4, 34-3, 35-3, 37-1, 39-5, 40-4, 42-1, 46-1, 48-2, 66-4, 71-1, 74-1, 84-1, 87-1, 94-5, 103-2, 120-1, 135-1, 158-2)

Response: Pages 226-230 of the FEIS contains discussion on wildfire susceptibility as related to risk and hazard. Reducing the amount, arrangement, and continuity of the fuels within the planning area is discussed in terms of reducing the overall hazard. The alternatives include a variety of treatments that are expected to reduce fire severity or the effects associated with wildland fire within the Metolius Basin. These include the reduction of the continuity of fuels between canopy layers, an increase in the average tree diameter of residual stands, an increase in the relative amount of fire resistant species, and a reduction in surface fuels. Table 4-6 (FEIS, page 240) provides a summary of how the alternatives will affect the amount of acres predicted to burn at mixed (30-80% mortality) and high (stand replacement) severity. The No Action Alternative is expected to leave approximately 97% of the area in these categories, while Alternatives 2, 3, 4, and 5 will result in a reduction to 94%, 67%, 53%, and 47% respectively.

The effects of the alternatives on stand density, large trees, and late successional and old growth structure are discussed on Pages 205-217 of the FEIS. The FEIS contains extensive discussion on the effects of the alternatives on wildlife species. The potential for effects are variable for each species, therefore, please reference pages 243-300 of the FEIS. Additional discussion can be found under the Vegetation Management in Late-Successional Reserves and Wildlife sections of this comment appendix.

It is also important to note, that although the thinning of brush, small trees, and burning will help reduce the risk of fires in some areas, it would still leave some areas with interlocking canopies or higher canopy closures at a high risk of crown fire.

Comment: Numerous individuals and organizations wrote in support of the defensible space strategy and emphasized that they felt that it should be the highest priority in terms of the timing of implementation. (8-1, 8-3, 24-1, 30-6, 70-1, 72-1, 72-6, 75-2, 81-4, 86-2, 93-5, 96-1, 115-1, 115-2, 130-2, 146-2, 153-1)

Response: The Sisters Ranger District has been aggressively treating hazardous fuels throughout what is now referred to as the Wildland Urban Interface. Past projects such as the Canal (1995), Underline (1996), Black Butte Ranch (1996), and Highway 20 (1997) were all designed to reduce fuels. The Hwy 20 project incorporated tractor mowing to help reduce the potential effect on air quality and expand the acres that have been treated. As of 2002, approximately 5,000 acres are treated annually. Recent wildland fires started to the west of populated areas and spread to the east. By treating the Metolius Basin, the district is expanding the crescent of treated fuels between the risk and the high value areas.

The FEIS (page 17) identifies that implementation of this project would commence as quickly as possible (depending on funding). Current year funds are available to commence implementation in the defensible space area during the summer of 2003 though any appeals or litigation would delay implementation.

Comment: The 600 foot corridor of reduced fuels should be created on both sides of all evacuation routes, including road 1217 west from the Metolius River. Road 1217 is not mentioned on page 11 of the Summary, but appears to be included in Figure 3. (146-4)

Comment: Lake Creek to west of MM development should be high priority of fuel reduction, but also south & north, Due to major residential investment. (91-1)

Response: Road 1217 is included in the defensible space strategy. Figure 3-5 on page 124 of the FEIS provides a map of the areas included in the defensible space corridors. The Lake Creek area mentioned is also in the defensible space corridors depicted in Figure 3-5. Please reference the response to the above question regarding where the defensible space treatments fit into the priorities. Wildland/Urban Interface areas remain a priority for the district's fuels program.

Comment: Given that much of this project, with an anticipated financial loss, is being proposed for "public safety", it is striking that fireproofing of the leased cabins is absent from this plan. To create such an extensive project, at taxpayer cost, while not requiring the USFS property lessees to take basic steps such as installing metal roofs raises the question how much this project is truly for "public safety" versus commercial logging. (126-10)

Comment: My point is to very clearly separate the “safety” of people and property from ecosystem changes thought needed. People have to do their own fuels reduction work within 30-60 feet of their own homes and this project should not imply it will realistically reduce safety or fire risk. (149-9)

Comment: The ORCFFF believes actions in the Metolius basin should be motivated by the needs of wildlife, and does not believe that the basin should be overly manipulated for the benefit of homes and other activities that are choosing to move into the area. Certainly no attempt should be made to “fire proof the forest”, especially considering the number of summer homes that still sport cedar shake roofs. (148-7)

Response: The FEIS points out that the reduction of risk of wildland fire consists of three levels (FEIS, page 39). The strategy of the Metolius Basin Forest Management Project was to help address risk associated with two of these levels. First, the risk of high severity wildland fire would be reduced across the project area through broad-scale thinning, burning and mowing. Secondly, focused fuel treatments have been incorporated to reduce the risk adjacent to residential and high use areas in the Wildland/Urban Interface. The third level of this risk reduction is the responsibility of the homeowners to manage fuel on their own property. Websites that can provide homeowners information on creating safety zones around their homes are found in the FEIS (page 39) and the Metolius Basin Forest Management Project website (www.fs.fed.us/r6/centraloregon/index-metolius).

Comment: Down wood is already deficient of the project area (EIS – 147/148). The less acres necessary to underburn (EIS – 234) the easier it will be to retain existing down wood. (129-4)

Response: No down woody material is prescribed for removal under the Selected Alternative. Existing down wood levels reflect the current stand conditions. As stands continue to grow, more wood will continue to be recruited. Efforts to protect existing material will be put in place. Prescribed burning is designed to consume the fine fuels such as needles, grass, and shrubs and to leave the larger material in place. Most burning will also occur in the spring when moisture levels of the duff and down wood are higher. This will help retain existing large material. Maintaining coarse woody debris at the rates described in the next response will help maintain long-term site productivity.

Comment: How is appropriate tonnage of coarse woody debris ensured to remain after logging for long-term nutrient cycling and to maintain soil productivity? (104-13)

Response: Mitigation measures are identified for coarse woody debris/down wood on page 69 of the FEIS. Measures call for leaving a minimum of 3-5 tons per acre within activity areas on Ponderosa Pine sites and 5-10 tons per acre on Mixed Conifer sites in accordance with the Forest Plan (LRMP SL-1).

Comment: We accept Prescribed Fire must be a part of the program here, even though individuals within the area suffer from the smoke. (30-8)

Comment: We disagree with the simplistic treatment of prescribed burning smoke as 'a viability issue lasting 1-3 days'. It is a life threatening impact for some people [the young and those over age 50; both age groups are an increasing part of our population]. (157-5)

Response: The Sisters Ranger District is equally concerned about the health of people. The district maintains an extensive contact list of residents that have medical problems and notify them prior to any proposed burns.

The Forest Service is also regulated by the Oregon State Department on Environmental Quality with whom every proposed prescribed burn is registered prior to ignition (FEIS, page 125, 242). The State then evaluates the cumulative impacts of smoke dispersal into Downwind Areas (DA's). Even though the Metolius basin is not a designated area we strive to minimize impacts to populated areas within our control. Site specific burn plans are planned and implemented under certain weather and atmospheric conditions that will facilitate smoke dispersal.

Comment: This Basin is no more of a fire hazard now than it was 50-60 years ago. It has always been a high fire potential – nothing has changed. (128-1)

Response: Past aerial photos, photographs, historical information, and personal conversations with some other residents of the Metolius Basin were used to provide perspective on the vegetative conditions during the time period mentioned. Other long time residents (50 years) describe the project area as once being significantly more open and were able to see a great distance through the trees when riding horseback from the northern portion of the project area to the head of the Metolius or to Bear Valley.

Fires have always had a role in shaping the landscape in the Metolius Basin. Historically the primary potential for fire was from lightning, and was often associated with rain. A review of our fire records indicates that humans are a primary cause of recent fires in the area. Escape is often associated with windy conditions. Luckily, roads provided ready access for firefighters, enabling them to catch many fires when they are small. The establishment of bitterbrush along with dense stands of ponderosa pine seedlings has significantly increased fuel continuity (both horizontally and vertically). As a result of this change, the likelihood of a severe fire has increased. The fires of the 2002 demonstrate how difficult fires are to stop in areas that are outside their historic fire regime and have missed several fire return intervals such as the Metolius Basin (FEIS, page 115-123).

Comment: I assume most of the historic, natural fires burned in summer. I am assuming most of this proposed burning would occur in fall and spring when the chance of escape is less. How does this proposed burning in seasons not normally burned affect wildlife, plants, etc.? Will it kill off the young in spring? Will it allow for exotic species that survive well for longer periods (e.g. knapweed) a better foot in the door? (149-19)

Response: Historically, low intensity fires occurred primarily in summer and fall seasons. However, due to the prolonged exclusion of fire from the system (most forests in the area have missed approximately 7-10 fire cycles, FEIS, page 16), the process of reintroducing fire into forests must be staged carefully to avoid igniting years of accumulated fuel and creating a hot, damaging fire. Initial ignitions in the spring, following mechanical removal of some fuels if needed, provide for a cooler burn. This often causes less consumption of duff layers, coarse woody debris, and snags. These cool spring burns have been performed as the initial entries for the reintroduction of fire on the Sisters Ranger District for years and most plants survive and quickly re-sprout because their roots are not damaged. Many fire dependent species, which need light disturbance and bare mineral soil to germinate, benefit from these burns as well. Often following a spring burn to reduce fuels, a fall burn can be accomplished as a second entry.

Burns performed at anytime of the year are vulnerable to weed invasion. Hot burns consume duff and affect the survival of native plants and would be more vulnerable to weed invasion. Spring burns consume less soil duff and seeds and leave most roots intact. This results in less bare soil being exposed and areas that are less vulnerable to weed invasion than a hot summer or fall burn.

Comment: I have worked for the USFS in fire for 25 years and grow increasingly alarmed about promises to the public for fire protection through logging. Stand replacement fires are weather driven and I think implying that the agency can control them is very misleading. (23-1)

Response: Weather does play an important role in stand replacement fires. Insect mortality, diseases, ladder fuels, brush, wind, and drought are a few of the factors that facilitate fire spread in ponderosa. Today, many more acres are burning at higher intensities (FEIS, page 117). Weather conditions, combined with changed vegetative conditions, have led to more extreme and unexpected fire behavior both locally and regionally (FEIS, page 118). In addition, it is recognized that there is evidence from recent fires in Central Oregon (Spring Butte Fire, Cache Mountain and Hash Rock) where prior thinning has modified the continuity of vertical and horizontal fuels and helped to bring a crown fire to a less intensive ground fire which has helped firefighters control the fire (FEIS, page 118 and 227). The information was provided, not to imply that the control of stand replacement fires are guaranteed, but to demonstrate how discontinuous fuel loading can and does help modify fire behavior.

Comment: Ladder fuels should be eliminated in thinned areas by pruning-up all limbs to 6 feet above the ground. (126-1)

Comment: I recommend mowing before underburning along the defensible space corridors. The unsightliness may be temporary, but too often the treatment gets hotter than expected and burns out some smaller trees in view areas. (1-4)

Comment: You might consider doing a little less work as far as removing ground cover. Once the trees are thinned, mowing and underburning might be expensive and produce little result in terms of fire risk reduction. Also I find that leaving some of the smaller slash provides good seed bed, raises soil moisture and lowers soil temps. I'm talking about tops and some limbs. (137-2)

Comment: I approve of prescribed burning as a treatment procedure. However, prescribed fires have burned out of control in recent instances. Additional precautions should be utilized particularly where the burns are in close proximity to people and structures. (146-3)

Response: Pages 39-46 described the various treatments that are prescribed for the stands in the Metolius Basin. Appendix A describes the type of fuel treatment that is planned for each unit within the alternatives. Depending on stand conditions, a variety of treatments are proposed. Pruning, mowing, and underburning would be combined with thinning as necessary within the defensible space corridor as stated on Page 40 of the FEIS. The Selected Alternative also includes provisions to retain bitterbrush by prescribing treatments that will help leave a mosaic of treated and untreated patches.

A comprehensive burn plan will be prepared for any prescribed burning proposal in accordance with Forest Service Manual 5140. Burn plans incorporate elements sufficient to prepare a prescription that meets resource objectives. These elements help identify the appropriate range of

atmospheric, weather, and fuel moisture conditions that will meet plan objectives, including smoke management objectives. Small test fires will be ignited to evaluate that conditions are conducive to ensuring a successful burn.

Comment: Advocate the return of the natural process of fire in the forests (113-6)

Comment: The ORCFFF prefers that controlled burns be the principle means to reduce over-stocked stand densities, but also supports moderate use of thinning and mowing techniques as necessary. In the future however, after over-stocked stand densities have been brought down to near or at historic stand densities, the ORCFFF expects natural functions and limited use of controlled burns to be the means by which stand densities (and fuel buildup) are maintained. (148-4)

Response: Page 119 of the FEIS points out that the forests in the project area are in Condition Class 3, which indicates a potential extreme accumulation of fuels, leading to an increased risk that normal surface fires would become catastrophic stand-replacing wildland fires. Reduction of the fuel loading with the treatment areas will go a long way toward moving the stands toward a condition that is consistent with natural fire regimes. The action alternatives, including the Selected Alternative help move these forests to a more fire-resilient condition (FEIS, page 235). It will be important to use the re-introduction of fire as a means to regulate fuel buildup through time. As the landscape area moves toward the historic low severity fire regimes, it may be possible for natural fire to assume more of its traditional role, however, under the Selected Alternative 67% of the area will remain in moderate to high severity fire hazard (FEIS, page 240). Notably, all of the action alternatives leave only 6-11% of the project area at risk of high intensity fires as compared to the current situation (No Action- Alternative 1) of 52% (FEIS, PAGE 40). Suppression efforts will continue to focus on firefighter safety and the protection of life and property, however, with 67% of the landbase still subject to moderate to high severity fire there would be a risk of allowing fire to resume its natural role.

Comment: Opening up forest stands too much (by removing larger trees and more canopy cover) may actually dry out micro-climate conditions, increasing the severity of fire and speed the passage of fire through the trees with greater wind speeds facilitated by openings, also increasing fire severity, potentially to stand replacement levels. Fire behavior in more open, dry stands may be more dependent on variables like wind direction/speed and time of burn. (104-2)

Response: Since a primary goal of the project is the protection of large, old trees, thinning of smaller trees is proposed. The FEIS (page 228) recognizes that forest stands with the greatest resistance to impacts from wildfire are those where canopy closure is less than 40%. Alternatives 4 and 5 do a better job at improving the landscape's resistance to wildfire. A low fire susceptibility stand would have a canopy closure of 20-39%, thus reducing the risk of crown fire, while still providing shade on the ground, cooler temperatures, higher relative humidity, higher fuel moisture, and screening to reduce wind (Beighley and Bishop, 1990). Although opening stands up can alter microclimates, the reduction of surface fuels can help limit the fireline intensity and lower the potential fire severity.

Comment: Your discussion of Class I airsheds leaves out the fact that Mt Washington Wilderness is also a Class I area and lies within a few miles of the Project area. (157-1)

Response: The FEIS discusses Class I wilderness areas in Chapter 3. Not all the Class I airsheds were identified by name in the DEIS. The DEIS focused on Mt. Jefferson Wilderness because it

was the one in closest proximity to the proposed burning activities. The FEIS has incorporated a more complete discussion on the potential to affect air quality in all the Class I Wilderness Areas in Central and Northern Oregon (Mt. Jefferson, Mt. Washington, Three Sisters, and Mt. Hood Wilderness Areas).

Comment: On human health effects there is no discussion of PM2.5, a NAAQS element since the late 1990s. Furthermore PM is not 'thought to effect human health'! It is a well researched and documented hazardous air pollutant and that is the reason it was a portion of the original Clean Air Act. (157-2)

Response: The national ambient air quality standards (NAAQS) are defined in the Clean Air Act as amounts of pollutant above which detrimental effects to public health or welfare may result. Particulate Matter less than 2.5 (PM2.5) is a newly regulated pollutant which makes up 90% of the Particulate Matter less than 10 microns in size (PM10) and is a part of those estimates. The FEIS (Page 125) discusses the PM10 as a critical pollutant thought to affect human health. The FEIS and the ROD discusses the coordination of burning with the State of Oregon that is responsible for the enforcement of NAAQS within their boundaries. By providing the State with site-specific burning proposals (see next comment and response), they are able to regulate prescribed fires within the State to minimize smoke effects (USDA, 2002) and meet requirements under the Clean Air Act..

Comment: There is no discussion of Oregon Smoke Management Plan nor the regional Haze Rule. (157-4)

Response: Fire managers on the Sisters Ranger District have been using a smoke modeling program as required by the Oregon Department of Forestry's Smoke Management Plan. Prior to every prescribed fire, planners provide site specific data to the state. Key elements of the data include: location, acres to be burned, type of burn, estimated fuel depth, number of piles, size of piles, fuel moisture, time of ignition, and duration of burn. The data is compiled and compared with other projects in the state based on the potential for cumulative effects. After review by the Oregon Department of Smoke Management, burning approvals and/or restrictions to burning are issued on a daily basis.

The Regional Haze Rule requires most states to develop long-term regional haze strategies. Regional haze is air pollution in the form of haze that travels long distances and can affect the visibility in national parks and wilderness areas across the country. The state of Oregon is currently in the process of discussing an approach to develop a regional haze state implementation plan. Since this plan is in the development phase, it was not discussed in this FEIS.

Wildlife

Comment: The FS is directed to manage habitats for all existing native and desired non-native plants, fish, and wildlife species in order to maintain at least viable populations of such species. Habitat must be provided for the number and distribution reproductive individuals to ensure the continued existence of a species generally through its geographic range. The FS must refrain from destroying habitat until they have completed population monitoring and documented viable populations of native species. (155-18)

Comment: The DEIS focuses on individual tree growth with a clear logging industry bias towards timber production now and in the future, at the fairly consistent expense/sacrifice to TES listed and rare wildlife species and interior and old-growth multi-layered canopy-dependent wildlife forest habitat.(104-4)

Response: This project is not expected to destroy habitat for native plants, fish, or wildlife species.

Plants which have viability concerns because of limited habitat or population size are identified by the Regional Forester and Oregon Heritage Data base as "Sensitive species". Surveys were completed for sensitive species and a biological evaluation of expected effects did not identify impacts that would likely contribute to a trend towards federal listing or a loss of viability for any species (Botany Report/Biological Evaluation, 1/10/03, page(s) 22-23 and Appendix A). No desirable non-native plant species were identified. Non-desirable, non-native plant species are called noxious weeds and are addressed in the FEIS on pages 168-171 and 307-316.

The Metolius Basin project does not propose to destroy habitat for native redband trout, bull trout, chinook salmon or any other native fish species. Extensive treatment design and mitigations have been employed to avoid such effects (FEIS, pages 68-73). Population numbers have been monitored for redband trout and bull trout in the Metolius Basin in the past decade (FEIS, page 158-159). Populations have been increasing within the basin in recent years and good population numbers have been developed. Protection of these habitats was one of the focuses during project design.

The Metolius Basin project used an indicator species approach in developing prescriptions for wildlife habitat enhancement. Indicator species are indicators of a larger guild of species with similar habitat requirements. The project is not destroying habitat but enhancing habitat conditions for a specific guild of species represented by the project focal species. These species, along with other species mentioned in the Deschutes National Forest Land and Resource Management Plan, were evaluated in a Biological Evaluation and further in a Biological Assessment and it was found that none of the actions were considered to lead to a trend toward Federal listing. The Forest Service is not required to conduct population monitoring for all species. However, surveys were conducted for those species with established protocols such as the northern spotted owl, great gray owl, and mollusk species.

Comment: Please drop the small remaining amount of thinning in spotted owl and goshawk habitat and connectivity for the reasons of existing life in the neighborhood. It is counter to the NFP to log these areas. (64-3)

Response: Much of the project area is comprised of ponderosa pine. This forest type does not provide suitable habitat for spotted owls because of lower stand densities (lower canopy covers) and it is not sustainable. Dispersal habitat existing in ponderosa pine can not be maintained as there is an increased risk of loss from a stand replacement fire, insects, and/or disease which may impact existing habitat and would prolong the establishment of future habitat (FEIS, pages 131-132).

The NFP (1994) states that late-successional reserves were designed to maintain late-successional forest ecosystems and protect them from loss due to large-scale fire, insect and disease epidemics, and major human impacts. Two main purposes of these reserves are as follows: a) to provide habitat for populations of species that are associated with late-successional forests, and b) to help ensure that late-successional species diversity will be conserved. Therefore, other late-

successional species were considered during the planning process for this Late-Successional Reserve other than the spotted owl due to habitat conditions present (FEIS, page 112). The Selected Alternative (ROD) does incorporate a decision to treat within the connectivity corridor but to maintain existing dispersal habitat. Therefore, primary treatments will be thinning from below (small tree thinning <12" dbh) and fuel treatments. Effects on the spotted owls are described on pages 244-251 of the FEIS.

Management actions were designed to promote future nesting and foraging habitat for goshawks. Nesting and foraging habitat are not static and in the short term may be reduced in quality or lost due to environmental factors. The effects of the alternatives on goshawks is discussed on pages 276-280 of the FEIS.

Comment: Protecting spotted owls from disturbance during nesting season is not enough to adequately protect their viability. We recommend thinning up to 8" diameter where fire hazard is most severe, preferably in buffer areas around core nesting, roosting, and foraging habitat and dispersal habitat or connectivity corridors rather than with them, as cover and density are desirable for the species. Thinning in Riparian Reserves (core habitat for spotted owl, lynx and fisher) should be restricted to only 8" diameter and less and only where fire hazard is most severe. (104-16)

Response: Reference pages 14-16, 128-132, and 244-245 of the FEIS. In addition to seasonal restrictions, the project incorporates a connectivity corridor designed to provide dispersal habitat in and out of the project area. Outside of the defensible space, no harvest will occur in suitable owl habitat. Higher stand densities will be maintained in the spotted owl focal area. These treatments will help promote and accelerate suitable habitat conditions. Implementing landscape-level treatments will help reduce the risk to existing suitable habitat.

The project was designed to meet several objectives including risk reduction and to also restore late-successional (old-growth) forests. In designing treatments for the project area (FEIS, pages 41-43), canopy cover was taken into consideration and stands occurring within the spotted owl focal area were designed to retain a more canopy cover based on the plant association group (i.e. mixed conifer wet or dry being able to sustain higher stand densities). Suitable habitat (nesting, roosting, and foraging) is not being treated except within the defensible space where the dominant treatment is removal of material 8" diameter or less. Dispersal habitat is being maintained within the connectivity corridor (ROD). Treatments will predominantly consist of small tree thinning (<12" diameter) and will retain a higher level of canopy closure.

The existing fire risk analysis shows that Lake, Davis, and First Creeks all exhibit high (stand replacement) fire risk as well as most of the Metolius River corridor. Jack Creek and a small part of the Metolius River corridor exhibit moderate fire risk. Most of the riparian thinning is limited to 12" diameter or less. In addition, most of the riparian reserves are located within the ponderosa pine plant association group (PAG) which is not providing suitable habitat conditions for dense canopied species like the spotted owl and fisher. No suitable habitat exists for the lynx due to the PAG and elevation of the project area.

Comment: The BE makes it clear that action Alternatives would result in significant degradation of spotted owl habitat (p 44). The BE also clarifies (p.47) that the action Alternatives are not consistent with the Deschutes Joint Programmatic Biological Assessment Design Criteria 1. There's insufficient range of Alternatives offered with regard to impacts to spotted owl dispersal habitat (BE p47 – between alt 2 and 5, only 513 acres difference in westside dispersal habitat impacts on and only) (104-20)

Response: Reference the Affected Environment (FEIS, pages 128-132) and the Environmental Consequences (FEIS, pages 244-251) for a more complete summary on spotted owls and the affect of the alternatives on its habitat.

Suitable spotted owl habitat consists of nesting, roosting, and foraging habitat. Approximately 179 acres out of 1059 acres of nesting, roosting, and foraging habitat will be downgraded within the project area.

Most of the dispersal habitat proposed for treatment occurs within the ponderosa pine PAG (45% of Westside dispersal habitat and 81% of eastside dispersal habitat). Dispersal habitat within ponderosa pine is not sustainable and does not provide desirable dispersal habitat. It consists basically of two layers of a very tall overstory with a small clumpy understory. Clumps tend to be very dense pole-size trees that are not conducive for owls to fly through. This plant association is dominated by ponderosa pine with little Douglas-fir or white fir available. Douglas-fir and white fir tend to possess a crown that is fuller and may provide better hiding cover for dispersing owls which may lessen the predation risk.

The planning area was divided into 4 habitat areas where specific focal species would be managed for consistent with long term sustainability of habitat. Guidelines were developed for the spotted owl focal area to maintain dispersal habitat or move toward suitable habitat conditions. A higher density will be maintained in stands within the mixed conifer wet and dry PAGs in the spotted owl focal area to achieve this. The Selected Alternative includes a slight modification to canopy closure within dispersal habitat in the designated connectivity corridor. Where 30-40% currently exists, we will maintain it at those levels as opposed to allowing it to be thinned down to 30% as called for in Alternatives 3 and 4.

The Biological Evaluation (p. 49) explains that we are not meeting Project Design Criteria in the Programmatic Biological Assessment due to the removal of constituent elements of habitat, the downgrading of 179 acres of nesting, roosting, and foraging habitat to dispersal habitat, and the removal of dispersal habitat in plant associations (mixed conifer wet and dry) where it is more sustainable. The required Section 7 consultation was initiated on April 6, 2003. The U.S. Fish and Wildlife Service Biological Opinion concluded that the effects of the proposed action and the cumulative effects are not likely to jeopardize the continued existence of the spotted owl and that this action does not affect critical habitat and therefore no destruction or adverse modification of critical habitat is anticipated.

Comment: Although it is typical for the northern spotted owl to occupy habitats within eastside forests uncharacteristic of the classic definition of their habitat, it is the responsibility of the Forest to manage for the structural characteristics of stands necessary for all habitat requirements, including dispersal. The Service recognizes that not all identified northern spotted owl habitat is sustainable over the long-term. The DEIS does not differentiate between suitable habitat that is sustainable and suitable habitat that is not likely to be sustainable for northern spotted owl when determining acres of suitable habitat loss as a result of implementing the various project Alternatives. The development of suitable habitat for northern spotted owls should be emphasized in the proposed action and should be clearly articulated. (122-4)

Response: Suitable nesting, roosting and foraging (NRF) habitat is limited within the project area. Suitable habitat is not being treated except where it overlaps defensible space zones. Within defensible space, treatment will occur in approximately 179 acres of NRF to minimize

risk and only trees 8" diameter and less will be removed. Currently, these stands are providing marginal NRF habitat due to the openness of the stands and large gaps between the overstory and understory. Removal of less than 8" trees will essentially remove the majority of the understory and treatment will convert the habitat to dispersal. These areas will be managed as defensible space for the long-term so managing for suitable habitat in these locations will not be achievable. No suitable habitat will be treated within any home range occurring within the project boundary.

The spotted owl focal area delineation was based on managing habitat where the majority of sustainable habitat occurs within the project area. Sustainable habitat is described in the Deschutes NF Programmatic Biological Assessment. In short, sustainable habitat is defined as stands occurring in the Mixed Conifer Wet (MCW) PAG and stands on northerly aspects with greater than 20% slope in the Mixed Conifer Dry (MCD) PAG. Approximately 2251 acres of sustainable habitat occur in the project area. The northern spotted owl focal area comprises approximately 17% of the project area occurring primarily on the western edge. All potential sustainable habitat was delineated for the spotted owl focal area. However, there is one exception to this. One area within the MCW PAG is dominated by western larch which does not provide suitable habitat conditions. These stands are very heavily infected by mistletoe and we are losing this component on the landscape. Therefore, the larch dominated area was not included in the spotted owl focal area due to the lack of western larch providing suitable habitat conditions and the need for treatment to maintain this component on the landscape for diversity. An estimated 46 acres of NRF proposed for treatment is considered sustainable.

Comment: The BE makes a case for not removing large live trees or large "hazard" snags as would happen under Alternatives 3, 4 and 5. There should be no logging of larger trees (above 8" diameter non-commercial thinning) in larger creek Riparian Reserves with fish-bearing streams, by the Metolius River and in its corridor and through larch restoration created by openings in bald eagle habitat. Large snags especially shouldn't be removed near the Metolius River due to depletion from recreational hazard tree removal. (104-19)

Response: Removal of large snags is not recommended under any alternative however there is the potential of incidental loss from project activities under all action alternatives. Thinning of trees >8" dbh and larch restoration treatments are designed to reduce the risk of loss of large trees and to facilitate the development of future habitat (replacement trees). The Biological Evaluation (pages 13-19) further explains that limiting treatment to <8" dbh material puts existing large structure at risk of loss from wildfire, insects and disease. Over 90% of the project area would be at risk of a mixed severity or stand replacement fire event with limiting treatment to <8" dbh (FEIS, pages 133, 255-256).

Comment: Bald Eagle will be negatively affected by removing current and future snag habitat in the area that is already snag deficient. (141-6)

Response: Removal of large snags is not recommended under any alternative however there is the potential of incidental loss from project activities under all action alternatives (FEIS, pages 133, 255-256).

Comment: Lynx are listed as threatened, so this project area habitat must be managed for lynx. There is insufficient cumulative effects analysis re: lynx re: combined effects with impacts from this project. (104-22)

Comment: The EIS does not fully disclose the effects of the project on lynx. The proposed actions are in an area that is possible habitat for lynx foraging and dispersal. It may

adversely affect the quality the habitat and will probably adversely affect the lynx's prey base. (155-23)

The EIS relies on Regional Policy for lynx that have not been subject to NEPA review and comment. The FS can not rely on these PDC until they have subjected the PDC and the Lynx Conservation Assessment and Strategy to NEPA and considered all environmental impacts and alternatives. (155-24)

Response: The Environmental Consequences for Canada lynx described in the FEIS and associated Biological Evaluation are based on the most current science. The determination for Canada lynx was developed using references such as Ruggerio et al. (1999) and McKelvey et al. (2000 and 2001). These publications include habitat descriptions, lynx biology information, and conservation measures. Based on this research, the lack of habitat within the project area, and the effects of the treatments within the Metolius Basin, the determination was made that there is No Effect on Canada lynx. Since no suitable habitat exists in the Metolius Basin, a project design criteria (PDC) review was not needed, nor were they relied upon.

Comment: Define "activity area" vs. "activity center" (122-7)

Response: These two terms are used interchangeably. A definition is provided on page 129 of the FEIS in which the activity center refers to "the core area in which the owls reside and is usually centered around a nest tree if known".

Comment: To avoid or eliminate potentially significant impacts to the northern spotted owl, the connectivity corridor should be designated and maintained over the long-term. (122-8)

Response: There are no reasonably foreseeable plans to re-enter the Metolius Basin within the next 10-20 years. The location of the connectivity corridor has been documented into our geographical information system and will be managed as a dispersal route for spotted owls over the long-term.

The connectivity corridor was established to provide dispersal habitat within the project area to areas outside the project area. The corridor connects to the adjacent LSR to the west and can be expanded north along Green Ridge. Treatments are limited within the corridor to retain dispersal habitat where it currently exists (either 30% or 40% canopy closure). Treatments will primarily be focused on removing small diameter material (<8" dbh). Post-thinning stand conditions will result in a higher average basal area. This will aid in reducing wildfire risk while still providing an avenue for dispersal through the project area.

The corridor was placed in plant associations that may be able to maintain slightly higher stand densities. Maintaining long-term dispersal habitat in drier ponderosa pine sites was not proposed as it is not compatible with reducing fire risk and it would overlap with areas that will be managed for defensible space (around main roads, high use areas like campgrounds, communities, etc.). The corridor placement was based on known activity centers, preliminary information on telemetry data from the 1990's, and recent survey information. Use has not been documented in the majority of the project area. Known spotted owl use tends to be concentrated around the fringes of the project area in areas with higher stand densities.

Dispersal habitat within ponderosa pine is not sustainable and does not provide desirable dispersal habitat. It consists basically of two layers of a very tall overstory with a small clumpy

understory. Clumps tend to be very dense pole-size trees not very conducive to owl use (little room to fly). This area tends to be dominated by ponderosa pine with very little Douglas-fir or white fir available. Douglas-fir and white fir tend to possess a crown that is fuller and may provide better hiding cover for dispersing owls which may lessen the predation risk. Management for spotted owls in the ponderosa pine PAG would not allow for the management of other late-successional species (i.e. white-headed woodpecker) if dispersal is retained at present levels.

Comment: The FEIS should disclose if the proposed actions to establish wildlife corridors to assist in the dispersal of ESA listed species (i.e. spotted owl) is consistent with the Northwest Forest Plan to support viable populations. (160-9)

Response: The project was developed using the Metolius Late-Successional Reserve Assessment and Metolius Watershed Analysis (FEIS, pages 19-22). Both documents are required assessments by the Northwest Forest Plan and recommend actions that implement the direct from the plan. Therefore, the project and proposed actions are consistent with the Northwest Forest Plan. The FEIS incorporated a discussion on consistency with the Metolius Late-Successional Reserve Assessment on pages 220-225.

Comment: Does the best available science conclude that owls will successfully disperse along straight linear corridors? (160-10)

Response: The FEIS addresses this question on pages 131-132. It is understood that species like the spotted owl disperse randomly. However, literature also suggests that a species will disperse and move through areas that have components of suitable habitat. Therefore, a corridor was developed for this project to maintain certain components of suitable habitat for the spotted owl, primarily canopy cover, in areas that are more likely to sustain higher stand densities for a longer period of time.

Comment: The snag management recommendations (Environmental Impact Statement-61) are inadequate for conservation of the white-headed woodpecker. The literature recommends higher levels of snags both in the smaller classes (10" diameter) and the larger size classes (20"> diameter) than the Environmental Impact Statement calls for. We recommend creating suggested levels and distribution of snags out of the trees scheduled to be thinned. (129-1)

Comment: The NEPA document does not adequately address the need to protect and provide snag habitat. Current direction for protecting and providing snags should fully meet the needs of the many species associated with this unique and valuable habitat component. Current science needs to be incorporated. (155-6)

Response: No snags would be removed except for hazard trees that create a safety problem under any of the action alternatives. In addition, efforts will be made to protect snags by burning mostly during the spring when moisture levels are higher and pre-treating stands to lessen burn intensity.

The FEIS has been updated to incorporate some discussion of the recently released DecAID tool (FEIS, page 152). This tool provides observational data on snag levels in stands in which wildlife species have been observed. Two habitats are present within the Metolius Basin planning area. Both habitat types (ponderosa pine/Douglas-fir and mixed conifer) exhibit high frequency fire regimes and are found in relatively flat to moderate slopes. Based on fire frequency, the ability to

retain snags on the landscape through an event, plant series, and topography, DecAID provides management recommendations for these habitats.

White-headed woodpeckers have been identified as a focal species for the Metolius project. The tool recommends a total of 4.0 snags per acre for pine types and 0.8 snags per acre for mixed conifer types for this species. Comparison of snag levels recommended by DecAID and levels identified in the Watershed Assessment with the existing conditions (FEIS, Table 3-14) shows that overall the planning area generally meets the recommended levels for total snags for white-headed woodpeckers. Frenzel (2002) points out that factors other than snag densities may be more important to white-headed woodpeckers. He also mentions that the quality of habitat has been degraded by years of fire suppression which has led to increased shrub levels and understories. This may account for the higher snag densities observed in the smaller size classes and may not be indicative of quality white-headed woodpecker habitat. The FEIS discusses the effects of the alternatives on white-headed woodpeckers on pages 280-283. Additional discussion on snags is presented on Pages 150-155 and 266-270 of the FEIS. Prescribed snag levels were developed during the Metolius Watershed Analysis process.

Comment: Deer winter range – The ODFW is concerned that more mowing and Prescribed Fire will occur in mule deer winter range then is necessary to protect the area from stand replacing wildfires (EIS – 234). We recommend limiting the proposed surface fuel treatments to the defensible space corridors, non-bitterbrush producing areas, bitterbrush producing areas with low forest crowns (i.e. pole and smaller), bitterbrush producing areas that have low bitterbrush shrub cover (10%<) due to high forest canopy cover and deep duff layer, and white-headed woodpecker snag clumps managed for nesting. (129-3)

Response: A modification to the Selected Alternative was made regarding the retention of bitterbrush within the Metolius Basin project area (ROD). Most stands within winter range will be treated however; a mosaic of treated (mowing/burning) and untreated patches will remain. Fuels and mowing treatments were designed to leave shrub cover and forage. Attention will be given to treat along roads outside of defensible space to break up the fuel continuity and to leave bitterbrush patches within the interior of the stand to provide winter forage opportunities. The FEIS (page 271 and Appendix D) analyzes and discusses the areas that can best support bitterbrush.

Comment: The current lack of snags and old growth trees warrant the raking around of these trees to protect them during prescribed burning. Down logs should be protect by fire lines. Snags that pose a safety hazard should be buffered to protect this ecologically important resource. (155-5)

Response: Efforts will be made to protect large snags and down woody material from being consumed during burning activities. Most prescribed burning will occur during the spring when moisture levels are higher and burning will result in a low intensity mosaic pattern. Prescribed burning is designed to consume fine fuels and large down woody material should be retained. Some material may be lost but this should mimic natural processes where the more decayed wood is consumed while new material is created. Most prescribed burning is also scheduled in the ponderosa pine PAG where lower densities occur naturally.

Comment: Since snags have a patchy spatial distribution, surveys to determine snag abundance require very large sample sizes relative to other general vegetation surveys. This was not recognized until recently, so most past surveys conducted have grossly

underestimated the true abundance of snags. This has led the agency to underestimate the number of snags necessary to protect species. This new information must be disclosed and documented in the EIS and requires a forest plan amendment. (155-7)

Response: The Metolius project area encompasses approximately 14,600 acres of National Forest lands and snag information has been gathered on nearly 2/3 of that area. Fixed radius plots were completed for both snags and down wood and averaged 1 plot per 5 acres over nearly 10,000 acres. This large sample size provided enough information to ascertain the distribution of snags on the landscape and the relative abundance by size class.

Comment: The FEIS should include relevant cartographic information showing where these corridors are connected to outside of the project area. (160-11)

Response: Corridor connections outside the planning area were approximated based on plant associations that typically support suitable habitat, but will not be finalized until a full analysis of the broader landscape can be completed. Corridor design and locations within the planning area provide connections both north/south and east/west to maximize dispersal opportunities to other landscapes.

Comment: I find myself more than mildly concerned about the mistletoe control/eradication. I am more interested in broad forest ecosystem functioning and view parasites as very important to this end. I strongly suspect that several frugivores including Western Tanagers and Townsend's solitaire are highly dependant on "infected trees" for a significant portion of their diet. (58-1)

Response: Dwarf mistletoe is naturally occurring within the project area and the proposed treatments will reduce the effect of the disease, but will not eradicate it within the planning area as discussed in Chapter 2 pages 39-44. These treatments are designed to help successfully regenerate larch and promote stand development of younger trees. Table 4-3, page 216 of the FEIS shows the amount of acres proposed for treatment in stands infected with dwarf mistletoe.

Comment: It is not clear how the Project activities would impact wintering elk. That herd is a highly-valued species here, and we'd want to be sure they would be able to persist after we're done. (72-12)

Response: Page 276 of the FEIS discusses the effects to winter range. Hiding cover will be maintained on 30% of the National Forest lands throughout the project area. However, there will be an overall reduction in hiding cover due to thinning which may decrease thermal cover resulting in increased snow depths. However, opening stands up may also stimulate herbaceous growth allowing more foraging opportunities in low snow areas. Road closures will reduce both fragmentation and disturbance to the herd (FEIS, pages 65, 141-144, and 271-276).

Comment: "May impact" determinations for Bufflehead and harlequin ducks and Pacific fisher are not qualified as to degree or severity of impacts. (104-17)

Response: Marginal habitat exists for these species in the project area, however impacts may occur due to the potential loss of structural diversity. The FEIS addresses the findings and rationale for these species on pages 257-264. The Biological Evaluation further explains the rationale for these findings on pages 52-59 and 68-72

Comment: Without field surveys, it can't be known that there are no Bufflehead nests in the project area. (104-17)

Response: Habitat within the planning area was reviewed. Only minor amounts of potential habitat are present. Analyzing impacts to the potential habitat that is present would lead to the same overall conclusion whether nests exist or not. The Biological Evaluation determined that the project "May Impact individuals, but will not lead to a trend toward listing". Impacts are expected to be minor due to the types of treatments (small tree thinning and underburning) proposed within potential habitat (FEIS, pages 257-261).

Comment: Has consultation with USFWS taken place for bald eagles and spotted owl? What were the results and why weren't they disclosed? (104-18)

Response: Consultation was completed on the project prior to the signing of the ROD and the results have been disclosed in the FEIS. Formal consultation for the spotted owl and informal consultation for the bald eagle was initiated with the U.S. Fish and Wildlife Service on April 6, 2003. Since, consultation needs to include all aspects of the final decision to accurately assess potential effects to listed species, it was not initiated until after the public comment period ended and comments were assessed. Therefore, it did not appear in the DEIS. Consultation was completed on the project prior to the signing of the ROD.

Comment: The Service believes that [project] objectives are best achieved by Alternative 3 with modifications to address additional protections for the northern spotted owl. The active management of the Metolius Late-Successional Reserve provided by Alternative 3 reduces the risk of wildfire while promoting to the maximum extent possible the character and sustainability of old-growth habitat. (122-1)

Response: Alternative 3 is the Selected Alternative. Modifications were made to the Selected Alternative to include more protective measures for the spotted owl as suggested (ROD). The connectivity corridor was developed to provide a dispersal avenue in and out of the project area, which will be maintained for the long-term. Dispersal habitat will be maintained throughout the corridor where it currently exists. Therefore, where 30-40% currently exists, we will maintain it at those levels as opposed to allowing it to be thinned down to 30% as previously described.

Plants

Comment: All sensitive and rare plant populations should be fully protected, not subject to logging impacts as proposed. (20-2, 21-5, 104-25, 167-3)

Response: The project as designed, including mitigation measures, is expected to have long-term beneficial effects to rare plants such as Peck's penstemon and Tall Agoseris, although impacts to individual plants may occur during implementation. These rare plants have evolved with more open forest conditions and frequent low intensity fire (FEIS, pages 165-168, 301-307.) Mitigation measures are designed to reduce negative effects to plants (FEIS pages 66 – 67). No impacts are expected that would likely contribute to a trend towards federal listing or a loss of viability for any sensitive species (Botany Report/Biological Evaluation, pages 22-23 and Appendix A).

Comment: Another needed amendment to Alternative 2 is to fully protect all sensitive and rare plant populations (such as Peck's penstemon Tall Agoseris, and Elaphomyces

anthracinus). Protecting all populations of such plants in the project area would better ensure species survival and prevent uplisting. (141-3)

Response: Avoiding or “fully protecting” rare plants such as Peck’s penstemon and Tall Agoseris may have both beneficial and negative effects (FEIS, page 301-307). Because these rare plants are adapted to light disturbance and more open canopied forests, maintaining existing conditions is not necessarily beneficial. Both plants need open sunny habitats to flower and produce seed. However, the risk of noxious weed invasion which degrades native plant habitats is a threat that accompanies management activities because more open sunny conditions which benefit rare plants are also vulnerable and attractive to noxious weeds (FEIS page 309). Mitigation measures will reduce this risk (FEIS, page 67). No impacts are expected that would likely contribute to a trend towards federal listing or a loss of viability for any sensitive species (Botany Report/Biological Evaluation, 1/10/03, pages 22-23 and Appendix A).

Known sites of the rare truffle, *Elaphomyces anthracinus*, would not be affected by any action alternative because they would be avoided and buffered, in consultation with the Research Mycologist who identified the sites.

Comment: Are all 14,000 acres going to pretreated and surveyed[for weeds] since all 14,000 acres will have activity? If not say so. If you propose to just survey open roads say so. If it depends on how much of a weed budget the District gets in any given year say so. If you will do the best you can with the resources that you have say so. I suspect that the merchantable trees will be removed, but burning, mowing, complete weed survey of all disturbed acres would be the first things to be dropped if limited resources to perform that type of activity. If so, say so. It seems like weeds is the least that can be done with the proposed intensive activity on 14,000 acres. Since many seeds can remain viable for 15-20 years, it is still likely that many infestations will occur even with lots of weed attention. (149-10)

Response: The analysis discusses that there is high probability habitat for undiscovered weed sites associated with old harvest units, on private land, and along major road corridors. It discloses that 36% of the area and major roads have been surveyed (FEIS, page 168). All action alternatives would create habitat which is inherently more vulnerable to noxious weed invasion and this is disclosed under “Unavoidable adverse effects” in the FEIS on page 402.

Weed Program budgets vary, however required mitigation is a priority for prevention and control funds. Weed budgets for the District have been holding steady and increasing in the past decade. Opportunities for assistance from community partners has also grown, because citizen groups such as the Metolius Watershed Council Working Group and Friends of the Metolius have an interest in prevention and control of noxious weeds in the Metolius Basin.

Comment: The least that can be done to prevent the spread of exotic species and encourage native species to thrive is to insist that native seeds be used on ALL disturbed areas. (149-11)

Response: Seeding with native plants is prescribed as a mitigation measure to prevent noxious weed infestation of bare ground (FEIS, page 67). If appropriate natives are not available, ephemeral non-natives may be used to temporarily occupy the site. These plants would fade over time and be replaced with natives. Minimal amounts of seeding are planned for the project because natural recovery of native plants is expected to occur in most areas. There is an inherent risk with any seed introduction, even native plant seed. Trace amounts of noxious weeds can be

present in even certified weed free seed and genetically appropriate local native seed is difficult and expensive to produce.

Comment: P. 74 Noxious weeds - is monitoring and pretreatment of noxious weeds before, during and after this project part of this project's proposal, or will just be done as District weed funds allow as they can get to it? What guarantee is there that the pre, during, and post weed work will be done? (149-14)

Response: The planned mitigation and its predicted effectiveness is discussed in the table on page 67 of the FEIS. As discussed, known existing weed populations covered under the 1998 Deschutes Weed Control Environmental Assessment would be prioritized and treated before ground disturbance. Landings and other highly disturbed areas would be surveyed after vegetation treatment as time and funding allows as discussed in the above responses. The emphasis of the project would be prevention of new weed infestations by requiring clean equipment, avoiding staging equipment in weedy areas, revegetating bare ground if necessary (i.e. landings), and minimizing ground disturbance.

Comment: P. 301 This project has a high probability of introducing or spreading noxious weeds. It is essential that more than just adequate attention is spent before, during and after the project to minimize the spread of weeds. If this is not guaranteed, the project should not move forward. (149-17)

Response: The mitigation measures listed on page 67 of the FEIS are required and will reduce the risk of weed invasion and help prevent new weeds from being introduced.

Comment: Opening up the canopy and disturbing the soil through road building and logging as proposed could spread non-native weeds far and wide. Existing sites need to be fully inventoried and documented as part of this project. We find it highly unlikely that conducting ground disturbing activities over so many acres will not make the weed problems worse instead of better. (155-22)

Response: The analysis discloses that all action alternatives of this project will have the unavoidable adverse effect of creating conditions, which are inherently more vulnerable to noxious weed invasion (FEIS, page 402). There are also associated risks of noxious weed introduction with the no action alternative, especially as related to a catastrophic wildfire and related wildfire suppression efforts (FEIS page 309.). Each action alternative includes required mitigation measures which will reduce these risks by pretreatment, survey, and prevention (FEIS, page 67).

Watershed/Riparian/Fish and Habitat/Wild and Scenic River

Comment: What can I expect you will do in the riparian reserves on all tributaries and the Metolius... how close, how big, and with what? (10-1)

Comment: Do not support mechanical tree removal w/in 160 feet of stream banks. A 30-ft buffer (discussed in mitigation, page(s). 327) is entirely inadequate. (72-11)

Comment: Protection of riparian areas is also important and overall I support the USFS approach to forest treatments in riparian areas. Mitigation of forest treatments in riparian areas should be a high priority. (24-2)

Comment: After a careful read of the Impact Statement and a review of the FS proposed action, support the FS intent to handle riparian areas with care while reducing fuel loads in the Basin. (29-1)

Comment: We are pleased with the special provision you have made for the riparian areas along the river and its tributaries. (30-7)

Comment: Protection of the riparian areas is of primary importance and thinning in the vicinity of flowing streams will be kept to a minimum with low impact methods. The Metolius River in particular would seem to require little thinning. (96-4)

Response: There are mitigations to reduce the effects for mechanical treatments in riparian reserves (FEIS, page 72-73, 337). On intermittent streams, a 30 foot strip will be maintained where no thinning will occur to protect root structure and small wood recruitment to the channel. Low impact machinery will be used to remove larger trees up to 16" in diameter. These techniques would include a variety of methods, including pulling line, using ATV or All Surface Vehicle type of small machines over frozen snow or frozen ground. Hand thinning and hand piling slash would be used when thinning trees less than 8 inches in diameter. Similar techniques were used in the Heritage Demonstration Project with good protection for intermittent streams.

For fish bearing streams, the only mechanical thinning of trees <16 inches in the Selected Alternative are along the outer edges of three (<10 acre) units. These units are along the First Creek riparian reserve near Road 1420. Pulling line from existing skid trails would apply to the two western units. The third unit would have special restrictions on equipment and access. Other small thinning units have been dropped from the Selected Alternative. A 60 foot strip from the stream banks on Lake Creek, First Creek, Jack Creek and the Metolius River will be part of the Selected Alternative (ROD) and no thinning will occur within this zone. The Fishery Biologist has discussed this concern with the Friends of the Metolius and they have since written a letter in support of the proposals to reduce wildfire risk in riparian reserves.

Comment: Concerned about the silvicultural prescription "where healthy stand conditions or sensitive resources would not need or benefit from thinning, then 8" diameter trees or less would be removed within the Defensible Space corridors... (Environmental Impact Statement Summary, page 11). This silvicultural prescription does not appear to adequately address potential negative impacts to sensitive aquatic resources, like 303(d) listed water bodies, where proposed thinning within riparian areas could negatively affect beneficial shading and potentially could exacerbate restoration activities. Please clarify. (160-13)

Response: The Aquatic Species Biological Assessment (Page 51) includes the following discussion on shade: Thinning small trees in the understory should not impact shade. The proposed project would not impact existing temperature regimes because shade trees will be protected by not thinning within 60 feet on perennial streams. Shade was modeled using the program SSSHADE (version 1.4) for summer months for Lake Creek, Jack Creek and the Metolius River. For east-west oriented streams (Lake and Jack Creek), a 60 foot setback for trees 8 inch in diameter would offer 98% of the July shade protection (100% in September). All of these stands have an overstory of larger trees that would be retained and would ensure the remaining 2% shade.

The Metolius River was modeled separately because of its north-south orientation and greater stream width (69 feet). Trees of 8 inch diameter, within 60 feet of the channel only account for a

maximum of 8% shade if there were no overstory trees. The Metolius River has larger trees along its banks and a set back of at least 60 feet from the river will maintain shade. Limitations include that no thinning of <8 inch trees will occur between recreation residences and the river, between Road 700 and the river, between the rimrock and the river in the Gorge area, within campgrounds and between Road 900 and the river (excluding Tract I). With these limitations to thinning, shade will be maintained. The FEIS has been updated to include this discussion (page 72 and 324) to clarify this point.

Comment: It is not clear to ODFW how proposed vegetation actions in the Riparian Reserve, except for meadow and aspen restoration, will be beneficial to the Riparian Reserve and protect water quality in both the short and long term. We recommend implementing road closures, reducing stream crossings, restoring the meadow and aspen areas, and treating areas identified as wildfire defensible space. We also recommend dropping the other proposed vegetation treatments in the Riparian Reserve unless benefits to Riparian Reserve values can be clearly shown in the short and long term. Consideration should be given to treating them 2-3 years after the uplands have been treated to act as sediment traps for any overland flow from upland thinning or potential nutrient inputs from prescribed fire. It is not clear what the wildfire risk would be once the uplands were treated. Other actions in the Riparian Reserve to treat stand density in the 12" to 21" size category are proposed with what appears to be of little benefit towards the creation of large tree structure quicker than through no action. (129-2)

Response: The objectives of thinning riparian reserves is to reduce the concentration of fuels along streams that would lead to intense wildfire effects to the streams in addition to improving conditions in the defensible space corridor. Thinning smaller trees will reduce the ladder fuels and reduce the risk of crown fires in riparian areas. Coupled with upland treatments, these treatments greatly reduce the effects of large wildfire over a landscape.

In the Selected Alternative, only three areas along fish bearing streams have been identified for thinning greater than 16 inch diameter trees. Thinning of trees less than 16 inches would occur along intermittent streams (non-fish bearing), with special restrictions to protect soils. These treatments would protect soils, retain the riparian reserve as filters for upland treatments and improve tree growth and reduce crown fire risk. Because these areas are generally upland vegetation, they will have a higher risk of intense wildfire.

A delay in the mechanical riparian treatments may be a sound method of protecting streams where the upland pose a risk of increased sediment or nutrient runoff toward the stream. The ROD discusses where the delay of ground disturbing vegetation management activities would be used.

The benefit from thinning trees in riparian reserves would be similar to that of the uplands (FEIS, pages 200 – 217). Although the majority of treatments in riparian reserves are focused on fuels reduction, some increase in growth would be gained through thinning smaller trees, especially in units which will receive thinning of trees between 12 and 16 inches (FEIS, page 330). This will also reduce the risk of stand replacement fire in riparian reserves (FEIS, page 323).

Comment: The FEIS should describe how DSC strategies of thinning trees of diameter of 8" or less would be effective in areas that already are experiencing lowered basal area, especially if any exist along riparian areas. (160-4)

Response: Areas along fish bearing streams that are prescribed for defensible space treatments will be focused on thinning to reduce ladder fuels and ground fuels (FEIS, page 49-58). Areas that already have low tree density will not be thinned below a fully occupied site.

Comment: The agency seems to claim that the direct sediment input from timber harvest in addition to any other sources of sediment will be sufficiently mitigated by the use of Best Management Practices (BMP's). We note that the use of these measures is not themselves sufficient to ensure compliance with the Clean Water Act. (155-9)

Response: The use of BMP's will reduce the possibility for direct and indirect sediment input from timber harvest and roads in the project area. The project does not solely rely on BMP's to meet Clean Water Act standards (FEIS, pages 324, 327, 329). The project is designed to avoid the risk of sediment inputs to streams by selecting which treatments to allow within riparian reserves with respect to the site landform, soil type and fluvial dynamics.

Comment: Further logging in this watershed threatens further violations of state water quality standards. This triggers an EIS and also requires that a TMDL/water quality management plan precede further actions that could increase stream temperature, nutrients, or sediment. (155-10)

Response: A Water Quality Management Plan is the responsibility of the Oregon Department of Environmental Quality. The USFS is responsible for and currently working on a Water Quality Restoration plan for listed streams in the Upper Deschutes subbasin. Lake Creek is the only 303(d) listed stream within the Metolius project area and the project has been designed to have no effect on shade and stream temperature for which it is listed. The Water Quality Restoration Plan will provide ODEQ with information to help in the development of TMDLs. This project will comply with that plan. Per our conversation with Tom Connor, EPA, the cooperative effort to develop a Water Quality Management Plan will assure that there is compliance with the Clean Water Act in this project.

Comment: The Final Environmental Impact Statement should discuss how implementation of proposed Defensible Space corridors around private lands and access roads, wherein existing fuel loads would be reduced, could cause further impacts to Clean Water Act 303(d) listed waters in the project area. (160-2)

Comment: The 2 303(d) listed waterbodies in the project area are the North and South Forks of Lake Creek. The listed water quality impaired parameter is high in-stream water temperatures. The braided channel network and low relief can negatively affect stream temperatures unless the riparian corridor is well vegetated and well stocked with shade casting trees. (160-3)

Response: The removal of small trees within the defensible space is not expected to have a measurable effect to stream shade along the 303(d) listed Lake Creek (Biological Assessment, page 51). The FEIS explains that shade will be protected in any treatment along the creek, therefore protecting the stream from further degradation (FEIS, pages 72-73, 186, 324, and 337). In addition, no thinning will occur within 60 feet along Lake Creek to help ensure that shade will be maintained.

An analysis was performed to assess how the implementation of proposed Defensible Space corridors around private lands would affect the 303(d) listed stream. Shade modeling revealed that there would be no measurable decreases to stream shade. Modeling predicts that trees less

than 8" diameter with an average height of 45 feet provide 98% of the shade with a 60 foot setback on Lake Creek. This value is expected to be higher because bigger trees overshadow most of the smaller trees (FEIS, page 324).

Comment: Discuss 303(d) listed streams more fully in the FEIS. The 303(d) protocol directs the USFS to validate that listed streams are impaired, demonstrated that sufficiently stringent management measures are in place to prevent additional degradation, and to proactively develop Water Quality Restoration Plans (WQRPs) and not wait for the development of a TMDL. (160-7)

Response: The USFS is not waiting for the development of TMDLs. We are currently working on a Water Quality Restoration plan for the entire Upper and Little Deschutes 4th-Field Sub-basins. This plan will help ODEQ in the development of the Total Maximum Daily Loads (TMDLs). Please reference the responses to the previous and following comments for additional information on the 303(d) listed streams.

Comment: Adequately disclose indirect and cumulative impacts to the Project's impaired waterbodies from both inside and outside sources. For example, while Suttle Lake is outside of the project area, temperature elevated surface waters from this resource are being discharged into the Lake Creek system which does contain 303(d) listed impaired tributaries. The FEIS should discuss strategies to restore listed waterbodies from further impairment. (160-17)

Response: The FEIS discusses the role of Suttle Lake discharging warm surface waters into Lake Creek (FEIS, pages 160-161, 181,186). Shade surveys have been completed on Lake Creek, and it seems the majority of the solar input is derived from Suttle Lake (Houslet 1999). Under the Selected Alternative, shade will be protected along Lake Creek, therefore protecting the stream from further degradation (FEIS, pages 72-73, 186, 324, 337). It would be outside the scope of this project to propose a change in the solar heating of the surface waters of Suttle Lake (Houslet 1999) or to 'restore' the thermal regime to that of an earlier, glacial age.

Comment: The EIS must address the cumulative effects of logging and roads on water quality. (155-11)

Response: The cumulative effects of logging and roads on water quality are discussed in the FEIS as they apply to the Aquatic Conservation Strategy Objectives (FEIS, pages 324-331). The Equivalent Clearcut Area (ECA) Model was used to assess the effects to flows and stream channel stability (FEIS, pages 331-333). Water quality was assessed in relation to fine sediment and nutrients (FEIS, pages 317-331). The effect of logging would be mitigated due to the high infiltration rates of the soils, road decommissioning, incorporating Best Management Practices for Water Quality, the use of low impact machinery, hand thinning (FEIS, pages 317-323) and delay in some treatments in riparian reserves outside of defensible space to maintain a vegetative filter (ROD).

Comment: Discuss how existing and future recreational goals will be met, and their impacts to riparian integrity, soil health, or disruption or sensitive or ESA wildlife populations. Without adequate waterfowl loafing areas in the upper Metolius riparian corridor, heavy recreational usage of the riparian areas may deter and/or impede usage by harlequin ducks, a listed USFS designated species. (160-14)

Response: The EIS recognized that there are several resource issues regarding long-term recreation management in the Metolius Basin, but that they were outside the scope of this analysis. This project is focusing on forest health and fire risk as related to the condition of vegetation. The Sisters Ranger District is proposing to conduct a separate environmental analysis to evaluate recreation use in the entire basin, so that proposed solutions to resource impacts are comprehensive, and do not simply move these impacts from one sensitive area to another. In the meantime, the Sisters Ranger District has been working on immediate administrative solutions to current site-specific resource impacts related to recreation use.

The Biological Evaluation clarifies on pages 56-59 that only marginal habitat occurs for harlequin ducks due to low caddisfly levels within the Metolius River. This may limit use by harlequins more so than increased recreation pressure. Tree removal, prescribed burning, and mowing treatments were designed to aid in enhancing habitat conditions by reducing risk to existing suitable habitat and promoting the acceleration of growth of future habitat. The Sisters Ranger District has also been placing large woody debris into the Metolius River which should enhance habitat and increase the number of potential loafing sites. The FEIS includes discussion on harlequin ducks on pages 135 and 257-260.

Comment: Jack Creek is probably the premier Bull Trout spawning stream on the forest and in Oregon. Protection of Jack Creek is accordingly a high priority of the SFPC. In its discussion of the concept of "Defensible Space," the Forest Service applies this concept primarily to protection of human communities. We believe that the concept should also be applied to natural resources such as Jack Creek and the Headwaters of Jack Creek. While we are supportive of no or very light treatment in the riparian area of Jack Creek, we believe that the Forest Service should adopt a more aggressive thinning plan outside of the riparian area in order to create a defensible fire buffer around the Creek. (159-5)

Response: Jack Creek is a primary spawning stream for bull trout in the Metolius Basin (FEIS, page 159). Protection for Jack Creek from wildfire effects have been taken into consideration with the design of the overall project. The concept of treating the uplands more intensively surrounding the creek is one method of protection. With the Metolius Basin project, the uplands were to be treated in an approach that restored the forest to conditions that would have existed under a natural, frequent fire disturbance regime. By thinning the uplands, the severity of wildfires over the entire landscape would be lowered, the risk of crown fires would be reduced, and the overall fire size is expected to be reduced. The increased humidity and green vegetation in riparian areas would lower the intensity of wildfires along this important bull trout stream.

Comment: The FEIS should discuss how it will meet the objectives of the Aquatic Conservation Strategy of the Northwest Forest Plan, especially Objective #4, within the Defensible Space Corridors areas that cross streams and rivers. (160-5)

Response: The Aquatic Conservation Strategy (ACS) objectives will be met in defensible space strategies (FEIS, pages 324-331). Objective 4 of the ACS objectives (FEIS, page 327) will be met as all possible changes to water quality are expected to be within the historic range of the basin based on what could be expected under natural fire regimes. All activities have been designed to minimize the adverse effects to water quality. Best Management Practices for water quality (FEIS, Appendix C) and mitigation measures will also mitigate adverse effects to water quality.

Comment: The upper Metolius is designated essential fish habitat (EFH) for Chinook. References to this mitigation were not adequately presented in the DEIS and should be included in the FEIS. (160-6)

Response: The Essential Fish Habitat (EFH) designation for chinook salmon habitat is addressed in the FEIS (page 159) and in the Aquatic Species Biological Evaluation. Mitigation measures to protect EFH habitat and their effects are identified on pages 72-73 and 318-320 of the FEIS.

Comment: Suggest the FEIS discuss the current level of knowledge and location of critical habitat designations for Bull Trout. Recommend that the FEIS include a Table, like Table 3-5 (page 126), that would cite all ESA or sensitive species that live within the project area (current table does not include fish spp). (160-8)

Response: Critical habitat designation for bull trout was identified on pages 152 of the DEIS and more discussion has been added in the FEIS in both the Affected Environment and Environmental Consequences chapters. The few listed and sensitive fish species are discussed in paragraph form on pages 158-160 and the effects to those species are discussed on pages 317-319 in the FEIS.

Comment: Amphibians, Frogs, Toads they need ground protection. These creatures will survive providing riparian areas are not disturbed. Ditches, for "water right" residents also provide habitat for many species. (167-2)

Response: Riparian vegetation is the prime habitat for these species and this generally extends an average of 20' from the stream's edge. The ditches do provide some habitat for creatures. However, this is only during the time when water is flowing. Many of the ditches are dry in the fall/winter, so the habitat is only temporary. Due to this temporary nature and the potential for sporadic use that is outside of our control, these areas are not considered as providing long term natural habitat.

Comment: The statement of purpose and need for this action is confusing. The Camp Sherman community's stated concerns for "the clean, clear water of the Metolius Wild and Scenic River the beautiful old-growth ponderosa pine forests" are not referenced again in the draft Environmental Impact Statement, and there is not evaluation of the effects of the proposed Alternatives on river quality. Specifically, the large amount of project activity within Riparian Reserves is not evaluated. (138-1)

Response: The FEIS addresses the effects that thinning trees, reducing fuels, and wildfires would have in relation to both fine sediment runoff into streams and nutrient changes (FEIS, pages 321-323, 327-329). Large scale thinning and prescribed fire may expose soil in the short-term which could erode into the stream network. Large areas of prescribed fire may change the nutrient content of runoff from roads due to the availability of ash. Thinning and prescribed fire may also increase the potential for overland flow which could result in sedimentation and/or in-channel scour.

Comment: The Metolius River has a wild and scenic status – doesn't that mean leave the area and river alone. (128-7)

Response: The Metolius Wild and Scenic River Management Plan provides direction for protecting and enhancing resource conditions in the corridor to meet plan objectives, including protection of the outstandingly remarkable values of the river corridor. Actions proposed within the corridor under the Metolius Forest Management project help meet those objectives (FEIS,

pages 335-340), including protecting the upland habitat from severe impacts from wildfire, insects or disease.

Soils

Comment: The DEIS indicates (p. 343), quite a few of the activity areas would still have in excess of the 20% threshold of detrimental conditions, even after restoration. That is troubling and unexplained – and is really not acceptable. (72-10)

Comment: The recognition of soil compaction is an important aspect, but a generalized 20% regardless of prior compaction or the type of soil allows for too much latitude. Compaction guidelines should be site specific with special attention paid to riparian areas (no mechanized vehicle compaction). (26-2)

Comment: It seems like over half of the 400 stands currently have exceeded soil standards or will exceed soil standards because of this proposed activity. It seems like this proposed project on top of past poor actions should still not leave an area with exceeded standards. There must be ways to do harvest action and also do rehab work so ALL areas will be within soil standards when complete? Such as harvest with 12 inches of snow, frozen ground, horse log, etc. If previously impacted soil conditions can't be rehabbed, what makes you think more of these kinds of impacts won't occur with this action? (149-13)

Response: As disclosed in the FEIS (pages 174-175), it is estimated that the majority of proposed activity areas currently have detrimental soil conditions that exceed Regional and Forest Plan limits for maintaining soil productivity. Almost all of these soil impacts occurred from harvest activities prior to the establishment of the Forest Plan (1990) and regionally approved soil quality standards and guidelines. The Regional supplement to the Forest Service Manual (FSM 2520, R-6 Supplement No. 2500-98-1) clarifies direction for planning and implementing new activities in areas where the extent of detrimental soil conditions currently exceed standards from prior management activities. FSM 2520.3 specifically states: “In areas where more than 20 percent detrimental soil conditions exist from prior activities, the cumulative detrimental effects from project implementation and restoration must, at a minimum, not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality.”

As disclosed in the FEIS (page 72), this Regional policy is incorporated into the restoration objectives to reduce cumulative levels of detrimental soil conditions anticipated from this project proposal. Surface area calculations of main skid trails and landings determine how much area needs to be reclaimed within individual activity areas of known size. The restoration acreage, displayed in Table 4-30 (FEIS, pages 352-364), is that necessary to comply with the Regional policy for previously managed areas. As disclosed in the FEIS (page 349), most activity areas would result in a net improvement in soil quality following implementation of project and restoration activities.

Project design criteria and operational guidelines for equipment use (FEIS, pages 68-72) will limit the amount of surface area covered by logging facilities. The successful application of these management practices would lower the percentages of detrimental soil conditions estimated in Table 4-30 and result in fewer acres of soil restoration treatments that would be necessary to achieve desired objectives.

Comment: The Soil Resource Specialist Report and DEIS fail to quantify or qualify the extent of damage or mitigation to soils – e.g. “minimize” or “reduce”. To what extent are impacts minimized or reduced? What is the threshold for irreversible damage for each site-specific soil? (104-8)

Response: As disclosed in the FEIS on page 62, “Mitigation measures are specific actions that could be taken to minimize, avoid or eliminate potentially significant impacts on the resources that would be affected by the alternatives, or rectifying the impact by restoring the affected environment (40 CFR 1508.02).

The management requirements, mitigation measures, and Best Management Practices (BMP’s) listed for soil and water resources (FEIS, pages 68 to 72) are all designed to minimize, avoid, or reduce potentially adverse impacts from the ground-disturbing management activities associated with this project. These requirements are to be implemented during or after the project in order to meet the stated objectives. Table 4-30 (FEIS, pages 352-364) displays the extent of impacts as percentages of detrimental soil conditions before and after implementation of project and restoration activities for each of the planned activity areas and action alternatives.

All action alternatives comply with Regional policy (FSM 2520, R-6 Supplement No. 2500-98-1) as stated in the response above. Project design criteria and equipment operational guidelines (FEIS, pages 68-72) provide options for minimizing the area of soil disturbance and reducing the potential for soil impacts in random locations of activity areas.

The action alternatives are not expected to create any impacts that would cause irreversible losses of the soil resource, such as soil mass failures (landslides). Soils dedicated to roads and logging facilities are considered an irretrievable loss until after their function has been served and the disturbed sites are restored back to a productive capacity (FEIS, page 402).

Comment: According to the regional guidelines soils in 80% of an activity area must be maintained in a non-compacted, non-displaced, and non-puddled condition. Soils must be “maintained”, not mitigated or restored to attain that objective. Mitigation should not be used an excuse for exceeding the regional soil guidelines. (155-12)

Comment: NEPA requires that a project not rely on post-activity mitigation to meet environmental protection standard, yet all action alternatives apparently rely on post-activity mitigation(primarily subsoiling) to meet Forest Plan standards for soils. (104-9)

Response: The extent of detrimental soil conditions in most activity areas would be reduced below existing amounts, resulting in a net improvement in soil quality following implementation of project and restoration activities (FEIS, page 349). The proposed actions comply with Regional policy (FSM 2520, R-6 Supplement No. 2500-98-1) for planning and implementing new activities in previously managed areas. The previous response and the one that follows contain additional information.

Comment: While soil mitigation standards allow up to 20% disturbance in a given treatment area, we encourage every implementation be structured as much as possible to better this requirement to a lesser number. This can be done by: specifying the contractor equipment to be used, the time of year, appropriate ground conditions, the intelligent layout of skid roads and landings, and on-site monitoring. Closure of skid roads followed by sub-soiling should be employed as a means of mitigating soil compaction and not be left out of the implementation due to lack of funds or a change in future priorities. (134-9)

Comment: Not all post-activity mitigation is effective or successful in reducing or elimination impacts and there is no guarantee that promised mitigation will be funded or accomplished. The soil report does not specify particular case studies where proposed mitigation was effective or compare them to site-specific situations where the same mitigation measures are proposed. Sub-soiling as mitigation is problematic in that sub-soiling can mix and disrupt soil horizons, impair soil micro-organism fertility, bring sub-surface rocks to the top organic layer of soils and destroy cultural artifacts (e.g. native pottery) and sensitive plants. None of these other potential impacts of subsoiling were analyzed. (104-10)

Response: The FEIS does not solely rely on subsoiling to meet soil standards. In addition to subsoiling, it incorporates numerous design elements into each of the action alternatives to help prevent or reduce the potential for impacts to soils (FEIS, pages 62, 68-72). During contract implementation, the Forest Service has control over ground conditions under which operations can commence and approves skid trail and landing locations prior to use. Low impact ground based equipment (ATV's or ASV's) is prescribed for treatments within the riparian reserves. Regardless of the funding source, the required subsoiling restoration treatments (Chapter 2, pages 70-72) would be accomplished to comply with Regional policy (FSM 2520.3), which is described in the FEIS on page 72.

On the Deschutes National Forest, subsoiling treatments have become a valuable tool for improving the hydrologic function and productivity on detrimentally compacted soils for the past decade (FEIS, page 347). Extensive areas of the forest are covered by ash deposits and other volcanic soil materials which are relatively easy to treat due to the absence of rock fragments. The "winged" subsoilers used locally have been shown to lift and shatter compacted soil layers in greater than 90 percent of the compacted zone with one equipment pass (Craig, 2000). Although rock fragments can limit subsoiling opportunities, hydraulic tripping mechanisms on this specialized equipment help reduce the amount of subsurface rock that could potentially be brought to the surface by other tillage implements. The mixing of soil and organic matter does not constitute further soil displacement because these materials are not removed off-site. The natural structure of soil horizons has already been altered by the effects of compaction. Subsoiling compacted soil layers likely improves subsurface habitat by restoring the soils ability to supply nutrients, moisture, and air that support soil microorganisms. Locations for primary logging facilities are designed to avoid known sites for cultural artifacts and sensitive plant communities.

Comment: Between the Environmental Impact Statement and discussions with staff, it seems that techniques are being utilized to minimize soil impacts, and to avoid impacts to water quality. (148-5)

Response: Management requirements, mitigation measures, and operational guidelines for equipment use are designed to limit the area of soil disturbance, reduce the potential for soil productivity losses, and protect water quality in the project area.

Comment: Why aren't regional soil guidelines not disclosed and the project analyzed for consistency with them? With so much underburning planned and "random locations" of detrimental soil impacts off existing skid trails expected to occur, there is no way to guarantee the end result would be 20% or less detrimental soil condition even if all mitigation measures were 100% successful. Most of the units planned for further mechanical soil impacts already exceed Forest Plan standards for soils. (104-12)

Response: Regional guidance is more clearly referenced in the FEIS and is described above in the response to comment 72-10. The Regional criteria for identifying the various categories of detrimental soil impacts is described on page 173 of the FEIS. Regional guidance for extent of detrimental soil conditions is consistent with Forest Plan standard and guideline SL-3 (FEIS, page 172).

As stated above, project design criteria and operational guidelines for equipment use (FEIS, pages 68-72) limit the amount of surface area covered by logging facilities and reduce the potential for detrimental soil disturbances in random locations of activity areas. The successful application of these management practices would lower the percentages of detrimental soil conditions estimated in Table 4-30 and help move conditions toward a net improvement in soil quality.

A burn plan addressing compliance with all applicable Forest Plan standards and guidelines will be completed before initiation of prescribed fire treatments in planned activity areas (FEIS, page 68). Prescribed underburns would be accomplished under controlled conditions that minimize the potential for detrimental changes in soil properties (FEIS, page 346). All action alternatives would comply with Regional policy for previously managed areas. As disclosed in the FEIS (page 349), most activity areas would result in a net improvement in soil quality following implementation of project and restoration activities.

Comment: Why wouldn't shallow compaction qualify as a detrimental condition? Severe burning of soils from slash pile burning impacts is not quantified and may not have been included in estimates of soil impacts. Cumulative Effects Analysis for soils fails to combine past effects with projected potential effects from this project (including worst cast scenario) as required by NEPA. What do these cumulative levels of detrimental soil impacts mean qualitatively for forest and plant growth, nutrient recycling, hydrology, soil fertility and soil productivity? "Existing conditions" that would be maintained with detrimental soil conditions for each action Alternative are not specified – would it involve maintaining exceedance of Forest Plan standards? (104-15)

Response: The comment regarding the effects of shallow compaction is addressed in the FEIS (page 343). The persistence of soil compaction is determined by climate, the shrink-swell potential of the soil along with the overall depth to the massive condition. Research has shown that the first few equipment passes over an area compacts the upper few inches of the soil. Additional passes cause greater increases in bulk density and compact the soil to greater depths. Where equipment makes only 1 or 2 passes over an area, the compaction is shallow and the bulk density increase is small (FEIS, page 343). Frost heaving and freeze-thaw cycles can offset soil compaction near the ground surface. Other natural processes that help restore soil porosity in soil surface layers include root penetration, gopher/rodent activity, wetting and drying cycles, and the accumulation of organic matter. As such, there would be no cumulative impacts on these minimally impacted areas.

Burning slash piles on skid trails and landings would not add cumulatively to other soil disturbances because soils on primary logging facilities would have already been impacted prior to burning (FEIS, page 346). Post activity review would determine the need for machine piling operations in various locations of activity areas (FEIS, page 346). Fuel management specialists project that the surface area in slash piles off designated facilities would comprise about 1.5 percent of an activity area (estimate of 3 piles, 15 feet by 15 feet per acre of harvest). It is expected that the area under these piles would have already been impacted by the machine piling operations. A conservative estimate, 15 percent increase in detrimental soil conditions, was used to account for the combination of mechanical harvest and machine piling operations (FEIS, page

347). If the machine pile/burn method is implemented off designated logging facilities, the 15 percent increase would include the disturbed area under these piles.

The detrimental soil conditions (before and after implementation) are displayed on Table 4-30 (FEIS, pages 352-364). It also shows the restoration activities for each of the planned activity areas and action alternatives. The cumulative detrimental effects for existing conditions and the predicted effects from project implementation are included in this table. Some activity areas would maintain existing soil conditions that exceed more than 20 percent of the unit area following this entry. However, all action alternatives comply with Regional policy (FSM 2520, R-6 Supplement No. 2500-98-1) for previously managed areas. The soil productivity issue and measures are described in the FEIS (pages 35-36). The scope of the analysis to evaluate the issue measures is disclosed in the FEIS (pages 173-174). Qualitative discussions regarding the effects of management activities on soil productivity are found in the soil sections of the Affected Environment and Environmental Consequences chapters of this FEIS.

Comment: P. 332 Soil - It is the cumulative effect of repeated entries over a long period of time that has the greatest potential of lowering soil productivity on forest sites. It doesn't display mitigation of proposed or past actions very well to bring soil back into reasonable condition or prevent problems in the future. (149-18)

Response: The last six columns in Table 4-30 (FEIS, pages 352-364) display estimated percentages of detrimental soil conditions and the restoration acreage that would be required following implementation of project activities. Project design criteria and operational guidelines for equipment use (FEIS, pages 68-72) provide options for minimizing soil impacts within proposed activity areas.

Comment: Spring burning can be harmful to soil and the thousands of creatures that live all or part of their lives in the soil profile. These impacts need to be considered and alternative ways to avoid these impacts need to be considered. (155-15)

Response: Prescribed burn treatments are conducted at times and under conditions that maximize benefits while reducing the risk of resource damage. The effects of fire on forest soils are extremely variable, and generalizations are difficult to make. Most effects to the inherent capabilities of soils are directly related to the intensity and duration of soil heating. The moisture content of the soil surface is the most important soil property that affects the rate of heat transfer into soils at the time of ignition. Spring burns are favored over summer or fall burns because higher moisture levels at this time of year generally result in cooler burns with low potential for causing severely burned soils. Burning over moist soils with cooler soil temperatures protects plant roots better and more organic matter is retained to supply nutrients for microorganism populations. The time the soil is exposed is short because spring green-up soon follows. Therefore, it is concluded that a cool-temperature spring burn, done on an infrequent basis, is less likely to cause long-term negative changes in soil chemical, physical, and biological properties.

Comment: Soil disturbance caused by logging also causes erosion that adversely impacts both soil and water resources. Existing soil impacts must be measured and future impacts estimated so that an adequate cumulative effects analysis can be prepared and included in the EIS. (155-16)

Response: The FEIS states on page 172, "Surface erosion is not a primary concern within the project area due to the extent of gently sloping to moderately steep landforms and the inherent porosity of representative soils". It also points out on pages 350-351 that, "All reasonable BMP's

for Timber Management, Fuels Management, and Road Systems would be applied to limit the extent of soil disturbance and control erosion on roads and logging facilities. These BMP's are tiered to the Soil and Water Conservation Practices Handbook (FSH 2509.22), which contains conservation practices that have proven effective in protecting and maintaining soil and water resource values. The Oregon Department of Forestry evaluated more than 3,000 individual practices and determined a 98 percent compliance rate for BMP implementation, with 5 percent of these practices exceeding forest practice rules (National Council for Air and Stream Improvement, 1999)".

The FEIS contains information on the existing condition of soils by unit, incorporates project design elements, and restoration activities. Table 4-30 includes estimates of the end results of implementation activities, including restoration treatments. No additional future actions have been scheduled for this landscape at this point in time.

Comment: A primary concern whenever prescribed fire is used is the loss of nutrients and impaired site productivity. (155-20)

Response: The anticipated effects of prescribed fire on soils are addressed in the FEIS on pages 346-347. Severely burned soil is a detrimental soil condition that usually results from high-intensity surface fires of long duration such as wildland fires that may occur under the No Action alternative.

Field observations of prescribed burns indicate that this condition is generally limited to areas where logging slash is concentrated into piles on log landings and main skid trails, and these sites already have detrimental soil conditions prior to burning. Although some nutrients would be volatilized during combustion, broadcast underburns of low-to-moderate intensity would increase nutrient availability and provide short-term benefits to site productivity over larger areas of ground.

Although prescribed fire can affect soil properties and nutrient cycling, its effects can be mitigated by developing specific burn prescriptions (Debano, 1991). Burn plans are prepared and approved prior to every ignition. Prescribed fire activities are designed to comply with all applicable Forest Plan standards and guidelines for meeting fuels, silvicultural, and other resource objectives (FEIS, page 68). Under all action alternatives, the extent of severely burned soil would be negligible because burning would occur in the spring over moist soil.

Comment: Were recreational impacts to soils factored into estimates of existing soil damage? (104-14)

Response: As disclosed in the FEIS (pages 177-178), the overall extent of soil disturbances from recreation use is relatively minor in comparison to disturbed areas associated with the transportation system and timber management activities. Most developed recreation sites are excluded from planned activity areas (FEIS, page 196). Short segments of developed system trail (average 0.2 miles) cross through portions of about 80 proposed activity areas. Due to the size of these activity areas, the amount of disturbed soil in these recreation trails constitutes less than 0.5 percent of the unit area. The percentages displayed for existing detrimental soil conditions are displayed by unit in Table 4-30 of the FEIS.

Comment: P. 68 Mitigation for Soils and Water - Figure 4-9 on page 336 shows that 2,000 to 3,000 acres of the center of the project area is a wet area with a high water table. It is

not clear how designated skid trails and log landings can be located on well-drained sites, upslope from potentially wet areas. (149-12)

Comment: The 87 logging units containing sensitive soils with seasonally high water tables (listed on page. 7 of the soil report) should be dropped from consideration for logging with ground-based equipment, yarding, mechanical piling or other foreseeable causes of detrimental soil conditions, as well as the portions of 35 sale units listed on p7 of the soil report that contain slopes of greater than 30%. (104-8a)

Response: As disclosed in the FEIS (page 344), “All action alternatives propose various silvicultural and fuel reduction treatments on landtypes that contain sensitive soil areas (Figure 4-9)”. The mitigation measure (FEIS, page 70) identifies the fact that portions of proposed harvest units contain sensitive soils with high water tables. The large area shown in the center of the project area (Figure 4-9) actually represents the overlap portion of proposed activity areas with the three larger landtypes (29A, 143B, and 164A) identified in Table 3-22 (FEIS, page 172). The landtype delineations contain localized areas with seasonally high water tables in drainage bottoms, swales, and depressions during certain months of the year. The sensitive portions of these landtypes are confined to specific segments of the dominant landform and they are generally too small to delineate on maps. Appropriate buffers would be applied to restrict mechanical disturbance in potentially wet areas and ensure protection of sensitive soils in such areas. The descriptions for Table 3-22, Table 4-29, and Figure 4-9 have been updated in the FEIS.

Activity areas proposed for mechanical treatments on sensitive soil areas are identified by unit number in site-specific mitigation measures (FEIS, pages 70-72). These mitigation measures are designed to limit equipment operations to locations and ground conditions that are less susceptible to detrimental soil impacts. Also see FEIS, pages 344 and 351.

Comment: Scarification, ripping, and subsoiling does not alleviate the following negative impacts, therefore not completely mitigating: Compaction of soil and alteration of the soil ecosystem; alteration of hydrology, water storage, flow, and timing from soils compaction; alteration or loss of native plant communities, and tendency to create conditions which favor noxious weeds or other non-native plants; and disruption of soil food web and biotic communities that serve important soil functions and processes such as aeration and nutrient cycling. (155-13)

Response: The effects of soil compaction have been extensively studied and research has shown that reductions in soil porosity directly affect the soils ability to supply nutrients, moisture, and air that support soil microorganisms and the growth of vegetation for long periods of time (Froehlich et al. 1983, Craig, 2000). When pore spaces are reduced in size and the soil becomes denser, infiltration rates and water storage are reduced and this increases the potential for surface runoff and erosion.

As disclosed in the FEIS (page 347), subsoiling treatments reduce these adverse impacts by improving the hydrologic function and productivity on detrimentally compacted soil. Effectiveness monitoring on the Sisters Ranger District has shown that the winged-type subsoiling equipment used on this forest lifts and shatters compacted soil layers in greater than 90 percent of the compacted zone with one equipment pass (Craig, 2000). Subsoiling loosens compacted soil and improves water infiltration to promote the recovery of native plant communities on disturbed sites that typically have less vegetative ground cover than undisturbed areas. Subsoiling also improves aeration in the soil, and the mixing of soil and organic matter

likely provides more moisture and available nutrients for microorganism populations. The FEIS (pages 307-316) provides detailed discussion about management strategies for treating and preventing competing and unwanted vegetation, including noxious weeds.

Road Access

Many people commented on road management and the number of road miles within the project area. Most comments generally supported a reduction in overall road miles. However, a handful of comments expressed concerns about possible road closures reducing access to recreation opportunities, including backcountry driving. Others expressed concerns about road closures affecting the ability for wildfire suppression. There were also comments about the management of off-road vehicle use, including prohibiting or limiting use in the project area. The variety of comments received is reflected in the examples below.

Comment: We all have an overflow problem in the area which we must do our best to manage. I don't believe that more road closures will solve any problems. (19-1)

Comment: I wholeheartedly endorse and support your plan for thinning and restoring the health to the Forest. It was said in the meeting that you and your staff support "Plan 4" the most. I would agree. The only topic I would have any reservations about is the road closures. I would support the closure of old logging roads, and roads that are, in essence, abandoned. (106-1)

Comment: I would suggest: A. That road closures be phased in by stages with time to evaluate each phase before proceeding with new closures. B. Keep safety and access by fire and emergency personnel as high priorities for road decisions. C. Closing 50+ miles of roads out of 151 total road miles may create too much density on remaining roads and camping areas. Many people consider quiet and relative isolation important factors in their forest land experience. (142-1)

Comment: Maintain accessibility for people with disabilities. (166-2)

Comment: I think "Option 4" is very well thought out and would be the best treatment for this area. The only point I have concerns about are the road closures. I wouldn't want to see roads that people use often being closed. However, roads that are no longer used or are by default, abandoned could or should be closed. Of course, any roads that cause damage to streams or the riparian area near streams should be closed. (107-1)

Response: Road access is a key issue addresses in the FEIS (page 37), and it is recognized that reducing miles of roads can reduce public access to certain sites in the project area. The FEIS addresses the question of what is the best network of roads to maintain for public use, while protecting forest resources. The potential effects of reducing the number of road miles in the project area are discussed in the FEIS. These include the effects to access for motorized recreation, effects on forest users with impaired mobility (FEIS, pages 388-391) and the effects on access for wildfire suppression (FEIS, page 231). Each of the road segments proposed for closure (either inactivation or decommissioning) were analyzed in a road analysis to determine both the public use values and impacts of the road. Roads determined to have moderate to high resource impacts, low public use value, and which could help mitigate potential watershed impacts from proposed tree removal, were the roads considered for closure.

Comment: Close one and another will pop up next to it. I am fairly sure that only a few riders [of off highway vehicles] are doing most of the damage. (19-1a)

Comment: The ORCFFF is very supportive of actions to prevent individuals from creating new roads, including adoption of forest-wide policies which prohibit motorized vehicles from straying off formally maintained roads. (148-9)

Comment: ORV damage in riparian areas continues to be a problem. Implementation of this project should manage the ORV/ secondary road issue to meet the standards of the Forest Plan. This is also an opportunity to implement new strategies to manage the problem (maps, signs, brochures, etc). (24-3)

Comment: I am also in favor of immediate cessation of ORV use within the Metolius Heritage Forest Allocation {Deschutes LRMP}. (156-5)

Response: OHV use within the Metolius Heritage area is restricted to established Forest System roads, and is enforced through a Deschutes National Forest closure order (2002). This restricted use is posted on signs on the main routes into the Basin and a pamphlet describing the closure, including the benefits to the Metolius Basin resources, is distributed to visitors. The Sisters Ranger District is working with volunteers from the community to improve the dissemination of information about OHV use restriction and to re-direct users to areas suitable for OHV use. The FEIS (page 390) addresses resource impacts resulting from OHV use in the project area, and how a reduction in road miles may indirectly reduce the amount of OHV use.

Comment: Amend alternative 2 - to also include road inactivation & decommissioning, like in alternative 5 - but increase the miles of roads vastly to stop the disturbance to wildlife & streams (many roads are unnecessary). (21-3)

Comment: We favor closing as many roads as possible to motorized vehicles an encourage you to adopt the road plan outlined in alternative 5. Closure prevents disturbance of wildlife and helps prevent the spread of noxious weeds. (60-3)

Comment: We are also strongly supportive of closing as many miles of roads as possible. We have personally witnessed the severe abuse and degradation of the forest floor by motorized vehicles and by dispersed camping along creeks. (69-2)

Response: Road Access is a Key Issue in the Metolius Basin Forest Management project (FEIS, pages 36-37). The FEIS recognizes that reducing miles of roads can help reduce resource impacts and mitigate effects from vegetation management, particularly sedimentation in the river system.

The FEIS analyzes the potential effects of reducing road miles on project area resources, including watershed, soil health, fish and wildlife habitat, rare plant habitat, wildfire suppression. The Selected Alternative proposes to close (either inactivate or decommission) approximately 60 miles of road.

Comment: For road density, open roads for the Metolius Heritage Area is to have at most 1.5 miles per square mile. The alternatives got down to 2.9, 2.5 and 2.4. It seems that since this project is such an overwhelming impact on this area, at least one alternative should display what it would look like to get down to 1.5 miles. If we can't get down to this level

with this broad scale project, we likely never will. If not, maybe the standard should be raised from 1.5 miles per acre. (149-20)

Comment: The significant decrease in roads as projected in the 1990 Forest Plan has not been met. (26-4)

Comment: We recommend reducing road densities to Forest Plan guidelines in all treatment units where fire risk reduction and stand density level objectives are met. It is important to provide justification for areas that exceed Forest Plan road density guidelines when forest and fuel objectives are met. (129-5)

Comment: I am in favor of road density reductions to meet forest Plan S & G. This may mean exceeding ANY proposal contained in the DEIS. So be it! (156-5a)

Response: Project objectives include reducing miles of open roads to mitigate potential watershed and habitat effects from vegetation and fuel treatments, and to move closer to recommended Land and Resource Management Plan guidelines (FEIS pages 16 and 73). The road density guidelines in the Land and Resource Management Plan are 1.5 miles per square mile in the Metolius Heritage area and 2.5 miles per square mile elsewhere on the Deschutes National Forest. This guideline is not an absolute standard, but rather a goal to work toward. All of the action Alternatives reduce road miles and help move toward the Land and Resource Management Plan guidelines. The Selected Alternative would reduce the maximum road miles analyzed; 60 miles.

The FEIS (page 187-188) recognizes that the Metolius Heritage area current baseline road density, at 2.1 miles per square mile, is greater than the guideline density and that it would require a close look with the local community to determine which of the baseline roads, if any, the public is willing to close to move closer to Land and Resource Management Plan road density guidelines.

Comment: I largely support alternative three. But I don't agree with more road closures as more large fire resistant trees are allowed to be cut. Road closures should not depend on the size of trees allowed to be cut. I should be a matter of limiting roads and ORV used...Not on size of trees removed. I'd appreciate an explanation. (95-1)

Comment: While I do not dispute that reducing the number of roads is a valid and good goal, I do not see how it is relevant to any of the stated proposes of the project. Consequently, roads should not be closed at the expense of not properly and completely reducing the risks of catastrophic fire to the Basin. (146-6)

Response: The FEIS (page 36 and 73) recognizes that vehicle use can result in soil compaction and displacement. Vehicles on roads not regularly maintained can result in surface erosion, sedimentation, and cumulative watershed effects. To mitigate potential cumulative watershed effects from actions proposed under Alternatives 2-5, reductions in road miles were proposed. Alternative 2 proposes reducing about 20 miles of roads in First and Suttle subwatershed. This meets the objectives of this Alternative to minimize watershed effects in these 2 watersheds that have been showing signs of cumulative impacts. Alternatives 3 and 4 propose reducing an additional 30 miles (for a total of about 50 miles of roads) in First and Suttle subwatershed, and in deer winter range. Alternative 5 proposes to reduce about 60 miles of roads in First and Suttle subwatershed, deer winter range, and other sensitive resource sites in the project area. The

increase in the road miles proposed for closure under Alternatives 3, 4 and 5 were intended to mitigate the increase in potential cumulative watershed effects due to additional acres and more intensive tree removal.

Comment: Finally, for a project of this scope, occurring in such a special area as the Metolius Basin, there is a notable lack of recreational enhancements. To alleviate usage in the immediate river riparian corridor, I suggest that road closures be combined with trail construction to create a pedestrian/bike trail paralleling the west side of the river. (Totally separate and apart from the Windigo Trail, leaving that to equestrian traffic) Starting in the vicinity of Lake Creek or First Creek and heading north terminating at Canyon Creek or Abbott Creek or even further. This "4-Creek Trail" would be a tremendous and interesting recreational enhancement while serving to disperse visitors outside of the verging-on-overused riverside trails. Trail construction should be a component of any goods-for-services stewardship contract. (126-11)

Response: The FEIS recognizes that recreation is a major activity in the project area (page 79). There are several issues regarding long-term recreation management that the Sisters Ranger District and local community would like to address. Including recreation management within this analysis was considered so that a holistic analysis to managing resources and uses in the project area could be addressed at one time. However, CEQ regulations require that projects remain fairly narrow and focused. Since the recreation management issues were not directly related to forest health and wildfire risk reduction, the Forest Service decided not to include these issues with this analysis.

Comment: Well traveled, marked roads, identified as inactivated but breached, should have their status changed to Open. Consider a more popular status for breached roads. (127-1)

Response: We appreciate the thorough review of road status in the project area. The Sisters Ranger District will review the inconsistencies mentioned in the comment letter and update the database.

Comment: ONRC has an inventory of roadless areas that are 1000 acres and a larger mapped roadless area (3000+ acres) on the west slope of Green Ridge. The NEPA document should recognize and describe the areas, roadless values represented, and the need for and the impact of treatments with in these areas. (155-26)

Response: During analysis of the Metolius Basin Forest Management project, a determination was made that there were no Inventoried Roadless Areas, as identified in the Roadless Area Conservation EIS (2001), or contiguous unroaded areas (FEIS, page 404).

Comment: We recommend no new temporary roads be built in the Metolius Basin. There is nothing temporary about a road. Even though ripped roads increase water infiltration over un-ripped roads, it does not restore the forest to a pre-road condition. (155-21)

Response: An estimated 0.25 to 1.8 miles of temporary roads may be developed under the Alternatives. The amount of soil disturbed by temporary roads would be limited to the minimum necessary to achieve management objectives. Since temporary roads are only used to facilitate the proposed activities associated with this project, these relatively short segments of road are not designed and constructed to the same standards as classified forest roads because they will be

decommissioned (removed) following project implementation. Design standards for temporary roads are essentially the same as primary designated skid trails used to access activity areas. The installation of temporary roads on gently sloping terrain generally does not require intensive soil displacement and excavation of cut-and-fill slopes. All reasonable Best Management Practices (BMP's) would be applied to limit the extent of soil disturbance and control erosion on roads and logging facilities (FEIS, page 351). Decommissioning treatments would be applied to restore and stabilize detrimentally disturbed soils committed to temporary roads and logging facilities (FEIS, page 366).

Comment: What is the difference between “decommission” and “close” roads? (166-1)

Response: Page 46 of the FEIS includes definitions of inactivation (i.e. road closures) and decommissioning. Road closures entail blocking vehicle access temporarily, while retaining the ability to use the road in the future. Therefore, it is not removed from the overall road system. Road decommissioning is intended to rehabilitate road segments that are not currently needed or necessary for use in the foreseeable future. It entails a variety of actions that include allowing the road to re-vegetate naturally, seeding or planting vegetation, removing culverts, stabilizing the road to prevent erosion, and/or subsoiling to obliterate the road bed.

Economics

Comment: All action alternatives would result in deficit timber sales anyway and there should be National Fire Plan money available to fund this project that doesn't hinge on commercial timber receipts. So what is the motivation to aim for larger tree commercial volume? The fire risk arguments for cutting larger trees (separating crowns, reducing basal density) have little scientific credibility and seem to be the public relations “positive spin” to justify logging of large trees in an area where the majority of local public (as well as the majority of the national public) clearly don't want larger trees logged. (104-7)

Comment: Thinning tools – be light on the land. “Along with efficiency and effectiveness, we would urge that impact upon the forest be given a high priority in your decision for the contracts of work. “When faced with a choice between efficiency and cost effectiveness on one hand and the accomplishment of environmental goals on the other, we would hope that the health of the forest would come first.” (72-7, 72-8)

Comment: If there are opportunities for some smaller diameter (less than 12” diameter) thinning to benefit small contractors I am all for it. But I think it is a mistake to tie commercial incentives into management of healthy forests. (113-5)

Comment: I am not in favor of disconnecting the cutting of the merchantable trees from the sales of products e.g. commercial timber sales. This adds an unnecessary step to accomplishing critical work {and long overdue e.g. Deschutes LRMP of 1990}. A huge barrier to accomplishing the Project's work is money. Product value and commercial success allows for several goals to be achieved. (156-6)

Comment: Trees of 21 inches Ponderosa and 25 inches in the fir should have some monetary value that could help fund this large venture. (9-2)

Comment: Restoration efforts should come first, not commercially-driven logging. (32-2, 46-5, 61-3, 64-5, 65-4, 68-4, 71-2, 126-8, 152-3)

Comment: Alternative 3, and especially Alternative 4 are unnecessary unless the underlying goal is timber extraction to "sweeten the deal" to logging firms that might bid on this. My understanding is that this isn't the reason this project is being undertaken - it was proposed specifically to reduce the increasing fuel load and subsequent fire danger created by decades of fire suppression. (49-2)

Response: The purpose and need of the Metolius Project includes reducing the risk of wildland fire and to improve forest health. The economic discussion on page 371 of the FEIS points out the fact that economics are not a driver in the development of alternatives. The objectives are forest health restoration or "forest stewardship". Where ecological objectives result in the removal of products that do have a commercial value they can help offset the cost of overall implementation of the project (FEIS, Appendix B, page 53).

Comment: After you have signed decision what sort of guarantee do you have that you'll have enough appropriated money to get projects done? (166-5)

Response: Although annual funding does vary, the average program of work on the Sisters Ranger District has provided sufficient funding to implement a mix of harvest, small tree thinning, ladder fuel reduction, activity fuel treatments, prescribed burning, and mowing on approximately of 5,000 acres per year. The FEIS (page 17) identifies that implementation of this project would commence as quickly as possible. Current year funds are available to commence implementation in the defensible space area this field season (any appeals to the signed decision would delay implementation).

Comment: Include the analysis of the Forest Products Harvest Tax into the economic summary. This tax is imposed on harvested forest products on private and public lands in Oregon. (15-5)

Response: The Forest Products Harvest Tax is a privilege tax of a specified rate per thousand board feet that is assessed on timber owners when timber is harvested from private and public lands. The tax revenue is used primarily to support forestry research, to support the Oregon Department of Forestry in its efforts to fight forest fires and administer Oregon's Forest Practices Act, and to support forest-related education through the Oregon Forest Resource Institute. The first 25,000 board feet of forest products harvested annually by any taxpayer during each calendar year are excluded from taxation. For calendar years 2002 and 2003, the tax rate was set at \$3.07 per thousand board feet of timber harvested. Receipts from the forest products harvest tax summed to \$21.6 million for the 1999-01 biennium.

The economic analysis incorporated a set of assumptions based on average values of material and costs associated with similar sales. It leads to a relative comparison of the costs and revenues associated with the alternatives (FEIS, page 372). Including the relatively minor cost of the Forest Products Harvest Tax (\$3.07/mbf) is not predicted to affect the overall comparison of the alternatives.

Comment: A comment was received from an individual that reviewed and is familiar with the variety of contract authorities available to the Forest Service and recommended using the conventional timber sale contract as well as an imbedded service contract in order to maintain the ability to collect sale area improvement and brush disposal funds to help offset implementation costs. (52-8)

Response: In addition to conventional contracts that the Forest Service has at its disposal, the Sisters Ranger District has applied and was granted Stewardship Pilot Authority for the Metolius Basin Forest Management Project. Stewardship contracts are fully described in Appendix B of the FEIS. The District will develop an implementation plan for the project area that will use the variety of contracting methods in order to efficiently implement the project activities.

Comment: The social and economic impacts of all of the Alternatives should have been covered in greater detail. The economic analysis is a little misleading. Your total cost of removing larger trees is only correct because of volume removed not on actual amount/unit of removal. More emphasis should have been put on unit costs and not total dollars. Furthermore, a lot of the cleaning up of fuels can be done in the logging operations making it cheaper and not more expensive. (111-12)

Response: The economic analysis was completed using average market values and costs associated with the removal of timber as a means to provide a relative comparison of the overall costs associated with the implementation of the alternatives. During the development of an implementation strategy, individual treatment units can be “packaged” in a fashion that will help maximize the economic efficiency during implementation. For instance, proposed treatment areas that do have a marketable product with values that exceeds the estimated costs of removal could be grouped and offered under a contract where there would be a positive return. These types of contracts can help generate revenue to help defray the cost associated with the treatments of activity fuels. Stewardship contracts could be used where groups of units are not individually “economical”, but do have some marketable products that would help offset the agency costs to treat the land (FEIS, Appendix B)

Comment: All of the economic discussion and analysis in the DEIS (p 182 & 362) refer to timber product values when the impact on recreational values should dominate this discussion. We conclude that to protect local economies in the long-term, we must first protect the recreational values of our National Forests. (93-2)

Response: The economic discussion in the FEIS (pages 371-379) does focus in on costs and revenues associated with implementation of the alternatives. It does, however, recognize that there are non-market values that are difficult to quantify. Recreational use in the area is highly variable in terms of the types of activities that individuals or group pursue. The effects on scenic resources, wildlife, road access, and recreation are discussed in Chapter 4 of the FEIS.

Comment: Depending upon the Alternative, the cost [of closing roads] ranges from \$49,710 to \$132,030. This amount would cover quite a bit of gravel for roads. As for those to be decommissioned, just let them remain in their current conditions and let nature do the work. I would much rather see this money to create small, inexpensive, informative, educational signs throughout the forest. (127-4)

Response: Appendix E of the FEIS presents some of the background associated with the roads analysis. Each road was looked at in terms of overall benefits, problems, and risks to assist in the decision process of the need for a given road. Roads that have been identified as creating resource problems and are surplus to long term needs were proposed for road closure or decommissioning. This will provide an opportunity to address watershed and wildlife concerns while helping move the overall road densities closer to Forest Land and Resource Management Plan standards. Page 46 of the FEIS describes the variety of methods that could be used to decommission a road. Where vegetation is already growing into the road bed from the surrounding forest, then very little action (and subsequent expense) may be needed to

decommission the road. There are some instances where soil rehabilitation and re-vegetation would be incorporated to successfully decommission a road.

Scenic Resources

Several people provided comments in support of proposed actions on scenic quality, including the following:

Comment: I also attach value to the enhanced beauty of the landscape: the deeper views into the forest, free of much of the clutter of excess fuels and unhealthy trees, are the stuff that gives one great pride and awe in nature. (1-2)

Comment: My interest lies primarily in ensuring that the ecological beauty of the basin is maintained, while at the same time restoring a healthy environment. Like most Camp Sherman residents, our family treasures the entire area and recognizes its unique character. (81-1)

Comment: By completing this project, I think a lot will be done to keep this area beautiful and here for the many generations of Oregonians who will visit in the future. (105-2)

Comment: Support visual quality amendment. Wildfire is not the most selective way to treat stand density problems. (111-5)

Comment: The Larch is a wonderful sight in early spring and after the frost has nipped them. One of my favorite trees could benefit from thinning and removal of sick trees. Being able to see through the forest in many places will be a benefit for years to come. (9-3)

There were also several people who expressed concerns about the potential negative effects proposed actions may have on scenic quality in the Metolius Basin.

Comment: As prior USFS surveys have shown, people come to the Metolius Basin primarily for its scenic beauty. This project should not diminish the area by creating hundreds of acres of stumps. (126-5)

Comment: The Metolius has been recognized as the Metolius Heritage Area and has not had any scheduled logging for over a decade. The Heritage Area is designated to protect and restore the old growth and maintain the beauty and recreation of the area with no planned logging. I object to the proposed DEIS Alternative 4, which could log old growth ponderosa pine in direct contradiction to the goals of the Metolius Heritage Area. I object to and do not understand why you have even proposed to possibly log any old growth trees. (158-1)

Response: The FEIS (pages 11 and 192) recognizes that high scenic quality is one of the outstanding natural qualities that attract people to the Metolius Basin, and that this beautiful scenery contributes significantly to the quality of life for the local Camp Sherman residents. The Land and Resource Management Plan provides management direction for maintaining scenic quality in the Metolius Conservation, and is addressed in the FEIS on page 195.

Though there may be short-term scenic impacts from tree harvest and prescribed burning (down limbs, scorched tree trunks), the long-term effects are predicted to be beneficial (FEIS page 388). Each of the action Alternatives would move the current scenic resource more toward that desired under the Deschutes National Forest Land and Resource Management Plan direction (Management Area-9, Chapter 4, pages 121-131), the least under Alternative 2 and the most under Alternative 5.

Comment: Landscape architectural methods should be employed to improve the Cascade Mountain views at the proposed overlook turnout along Road 14 and at the Headwaters of the Metolius viewing area. Many small trees less than 8"dbh lie within the fenced viewing area of Headwaters and need to be removed to retain the view from the upper walkway and sitting bench. (134-8)

Response: The proposed action does include thinning trees below the turnout along Forest Road 14, and this thinning will be coordinated with a Landscape Architect.

Small trees blocking the view around the Headwaters viewpoint are on private lands, not National Forest lands. There are opportunities for the Forest Service to coordinate with the landowner to enhance the view.

Comment: All medium and large trees should be retained. (Various)

Response: Late-Successional Reserves were established under the Northwest Forest Plan to protect and enhance conditions of old-growth forest ecosystems. The current condition of much of the old-growth habitat in the Metolius Basin project area is not stable, due in part to a long absence of low intensity fires. Overcrowded conditions, recent droughts, and subsequent epidemics of insect and disease have put tremendous stress on these forest stands, and some are now rapidly declining (FEIS 118-119).

In certain stands the density of medium/large trees is higher than can be sustained, and are outside the natural range of variability for these plant associations. In other words, the trees within the stand are at a high risk of being negatively affected by insects, disease. Actions which reduce forest densities, and modify forest structure and fuels are predicted to move conditions closer toward sustainable conditions, and are expected to reduce the risk of severe stand-replacing wildfires and widespread insect and disease outbreaks, and intensity of effects when disturbances occur (Brookes et al., 1987). These actions are also predicted to help maintain old-growth ponderosa pine longer (FEIS page 116).

Heritage Resources

Comment: Chapter 2, pg. 72, under Heritage Resources—there should be clarification on whether Heritage Resource sites/areas are being considered as only inclusive of the site/area proper or whether an established buffer zone is also included. (168-1)

Response: Protection of heritage sites will be coordinated with the District Archaeologist and the type of protection is dependent on the nature of the site and the type of action that is being implemented. Where activities have the potential to disturb the ground associated with a site, a buffer is included.

Comment: An environmental consequence may be the picking up of artifacts by those working on projects; however, there is no approach noted on how to deter project workers from doing this. We suggest providing workers education on the legal parameters and importance of cultural resources. (168-2)

Response: Both the timber sale and service contracts contain provisions for the protection of existing sites and for any new sites found during their operation. Contracts include requirements that the contractor halt work and notify the Forest Service if a previously unidentified site is found during their operation. In pre-work conferences, the contract is reviewed with the operator and they are informed of the legal requirements and the importance of protecting the cultural resources.

Forest Plan Amendments

Comment: Support the amendments. The fuelwood amendment might clarify that it would be inappropriate to permit larch fuel wood collection in the Heritage Area or to promote ORV use for firewood collection. Cutting living trees should not be permitted. The amendments for the short term seem reasonable. Would these be terminated, reverting after that time lapse, to the original standard? (72-5)

Comment: Write the amendment so that standards revert to their original language after those interim conditions expire. We urge that the firewood amendment to be carefully crafted so we don't encounter unexpected results. Given the folk preference for larch firewood, we need to be very careful about how wide that door is opened. Actually we'd prefer not to see that one opened at all. (30-9)

Comment: Also some of the smallest trees could be designated for home firewood use. So that this material could be removed in the most expeditious manner, there needs to be some flexibility in the dates for firewood cutting and gathering. (73-3)

Comment: Open up the entire basin to free wood cutting and down and dead timber. Even some dead standing snags could be marked for wood cutting. (128-12)

Response: The site specific forest plan amendment for firewood collection is predicted to occur over a short period of time during the implementation of the project (approximately 5 years). After implementation, the original standard and guideline for the Metolius Heritage Area would be in effect. The intention of this amendment is to provide some flexibility for the district to determine where firewood gatherers could help accomplish the project objectives of forest health and fuel reduction, while providing the public with the opportunity to utilize some of the material that would be a by-product of implementation. It is not intended to open the entire area to firewood cutting. Permit conditions would be developed. Commercial and personal use permits would be issued only in designated areas where the effects of the firewood gathering would be commensurate with the effects analysis presented in the FEIS. Site specific prescriptions would be developed that define the area, season of use, species, and size of material that could be removed.

Other Effects

Comment: Past plans have not put enough emphasis on the need for prior and post treatment monitoring to make certain that the goals as put forth under the plan is meeting its objectives. (26-5)

Comment: First, upon selection of an alternative, when will the project begin? How will contract compliance be ensured? Past projects on the Sisters District have had significant compliance issues, up to and including timber theft. (126-9)

Response: An integral part of the Metolius Basin Forest Management project is monitoring the implementation of the project with a multiparty team of community members representing a range of interests (FEIS Appendix B, page 55). This team is currently establishing proposals for pre and post treatment monitoring. Project implementation is scheduled to commence this summer barring any delays from appeals or legal challenges. Throughout the life of any contract, Forest Service representatives that are trained in contract administration conduct contract inspections and administer the contract for the agency.

Comment: Under the heading "How" on p.5 the statement is made that "the project would be implemented through a combination of traditional service contracts, timber sales contracts, stewardships contracts and partnerships." My questions are: How are these contracts awarded? Who applies for these contracts? How are they monitored? (2-2)

Response: Contracts are awarded through a competitive bidding process. Generally speaking, individuals or contracting companies that have the resources and skills associated with the type of work required in the contract bid on these contracts. Timber sale and service contractors in Central Oregon include locally and regionally-based contractors. Contracts will be monitored by Forest Service representatives and by the community-based multi-party monitoring team to ensure contract provisions are being met.

Other Required Disclosures (NEPA)

Comment: The DFC section should remove the subjective, value-laden material and put in some specifics regarding stand characteristics (stocking levels, canopy closure, wildlife habitat, etc.), roads, recreation, etc. The DFC needs to be measurable and stated in terms the agency has control over. (114-5)

Response: The Desired Future Condition (DFC) described in the EIS was written to highlight that the Deschutes Forest Land and Resource Management Plan (Forest Plan) recognized the Metolius Basin as truly unique in the quality and diversity of its natural resource and spiritual values. Due to these qualities, the Metolius Conservation Area was established in the Forest Plan (1990). The Metolius Basin Vegetation Management Project includes portions of four of the 10 management areas that were established within the Basin (Forest Plan, 164-202). The FEIS describes the goals of these management areas on pages 17-19. Page 21 of the FEIS does identify and discuss the specific goals and objectives associated with the Late Successional Reserve Assessment. These include providing for sustainable vegetative conditions with the natural range of variability, maintaining habitat for spotted owls, where sustainable, and restoring and maintaining riparian ecosystems while protecting them from fire, insects, and disease.

Page 16 of the FEIS points out the fact that 82% of the forested stands are at higher stand densities than can be sustained over the long-term and over 97% of the project area is at risk of moderate to high severity wildfire. Given the goals associated with the LSRA, the project was designed to reduce these risks while meeting wildlife habitat objectives through specific silvicultural and fuel treatments (FEIS, pages 40-44). A range of alternatives were designed to address and evaluate different options to address these risks and disclose the resource trade offs associated with different levels of treatment. Quantifiable measures are included to evaluate the effectiveness of the alternatives at meeting the project goals and objectives (FEIS, pages 32-37). The environmental effects are disclosed in both quantitative and qualitative terms in Chapter 4.

Comment: It is inappropriate for the Forest Service to address the "Oregon 11 Point Action Plan." AFRC would like to see all references to the "Oregon 11 Point Action Plan" removed from the DEIS to avoid any confusion. (114-8)

Comment: Purpose and Need - The Healthy Forest Initiative is cited within the purpose and need section. As the Healthy Forest Initiative is not yet law, it is inappropriate for proposed legislation to guide district planning. (138-2)

Response: Discussion of the Healthy Forest Initiative and Oregon 11 Point Action Plan was included in the DEIS (pages 22-23) to provide some additional information to the public about some of the more recent forest management discussions that have been occurring at the state and national level. This has been clarified in the FEIS. They were not included to imply that they were used to guide the project planning. The Deschutes Forest Plan, as amended by the Northwest Forest Plan provides the management direction under which the Metolius Vegetation Management Project was developed. Alternatives were developed and discussion is included in the FEIS regarding consistency with the Forest Plan direction. No further mention is made of these two documents.

Comment: The wide-ranging impacts of activity on this project area and its proximity to the Eyerly project area requires that the impacts of both proposed activities be considered cumulatively. While the projects are separated by a considerable distance via road, the impacts on wildlife species within the 5 or 6 miles between the 2 projects could be considerable. (138-4)

Response: At this point in time, the Eyerly Fire Salvage EIS interdisciplinary team is in the process of developing alternatives and analyzing the effects of the alternatives in the preparation of a draft environmental impact statement. To date, this has not been completed. Pertinent cumulative effects associated with the two projects will be discussed in the Eyerly EIS. This will allow the Eyerly project team and the decision maker to consider the cumulative effects of its fully developed alternatives with the Selected Alternative from the Metolius project. The Eyerly project is still in its development phase and it is uncertain as to the final alternative designs and which alternative (including No Action) might be the preferred or selected alternative. The record of decision is expected to be issued in the Fall of 2003. The Metolius Basin Vegetation Management FEIS, however, has been updated to address the cumulative effects on wildlife species and other resources (where the potential is expected to exist) to better address the cumulative effects of the Eyerly Fire and the Eyerly Fire Salvage Project.

Comment: NEPA requires disclosure of information necessary to determine compliance with legal requirements such as the ESA, CWA, NFMA, and LRMP S&Gs (40 CFR 15087.27(b) (10). The EIS must document compliance with these laws. (155-7)

Response: Chapter 4 of the FEIS includes discussion on compliance with the above laws (pages 13, 16-17, 19-22, 62-74, 127-137, 165, 186, 243-265, 317-320, and 404). In relation to ESA, the EIS discloses information on the effects to listed fish and wildlife species which incorporates the rationale for the determination of effects. A biological assessment has been prepared and consultation has been completed for the northern spotted owls, northern bald eagle, bull trout and Essential Fish Habitat for Chinook salmon. The project record has a concurrence letter on file from the regulatory agencies.

Chapter 2 and Chapter 4 of the FEIS both contain extensive information in regards to the environmental effects of the alternatives and documentation of consistency with standards and guidelines for the FLRMP. Two non-significant, site specific Forest Plan amendments have been identified where existing standards will not be met. These short term revisions of the standards and guidelines are discussed in detail on pages 398-400.

Comment: References to the Late-Successional Reserve Assessment and Metolius Basin Watershed Analysis should be made with caution. There is ample case law that clearly shows the Forest Service cannot rely on such documents for direction since they have not undergone NEPA analysis. On page 217, the DEIS states, "The Sisters Ranger District proposes to update the Metolius Late-Successional Reserve Assessment to include provisions for when trees larger than 21" diameter could be removed..." AFRC strongly objects to this proposal to codify the arbitrary 21" diameter limit. The NFP does not include diameter limits (nor age restrictions in LSRs on the eastside) and for the Sisters RD to do this constitutes amending the NFP. Such action must be done publicly using the NEPA process. (114-9)

Response: The Forest Plan, as amended by the Northwest Forest Plan, provides the overall direction under which this project was developed and analyzed. The Metolius Late-Successional Reserve Assessment (MLSRA) sets the framework for projects, but does not make any decisions to undertake a project. The assessment itself is not a NEPA or decision document and it does not make any site-specific decisions. It was not intended to imply that the underlying direction comes from these documents. What they do is identify management recommendations or activities needed to 1) reduce the risk of habitat loss from catastrophic disturbances such as fire, insects, and disease and 2) sustain late-successional habitats whether the goal is to provide fire or climatic late-successional conditions. The MLSRA provides some specific goals (FEIS, page 21) that were used in developing the purpose and need of this project.

The management assessment was developed for the MLSRA in accordance with the Record of Decision for Management of Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl (April 1994). Attachment A, Standard and Guideline C-11 identifies that this assessment should be prepared before habitat manipulation activities are designed and implemented (MLSRA, page 4).

In relation to the update of the MLSRA, your point is well taken and it is not necessary to update the document to address when 21" diameter trees can be removed. This discussion has been removed from the FEIS. Site-specific decisions associated with NEPA analyses, such as the Metolius Basin Vegetation Management Record of Decision, is where specific decisions are made about management actions.

Comment: AFRC would like to see the Purpose and Need clearly articulated. Granted the DEIS discusses local concerns and existing direction under this section but it's not entirely clear just what the Purpose and Need is. (114-6)

Response: Pages 14-16 of the FEIS point out the primary needs for vegetation treatments within the Metolius Basin: Fuel reduction to reduce wildland fire risk and stand density control to reduce the risk to habitats from elevated susceptibility to fire, insect or disease. The need to reduce fuels is not only at the wildland urban interface, but also over the larger Metolius landscape. Fuel reduction treatments at this scale are intended to reduce the risk of high intensity crown or spotting fire that can affect other resources and to homes within the wildland urban interface. The purpose and need also cites the fact that due to the exclusion of fire, stands are currently overstocked and carrying densities of trees that lead to an elevated risk to late-successional habitat to not only wildfire, but to insects and disease as well.

Comment: Disclose how the Deschutes National Forest has consulted and coordinated with Tribes in development of the Environmental Impact Statement as required by the Executive Order 13175. (160-16)

Response: Numerous Tribal Members, including the Chairman of the Tribal Counsel, from the Confederated Tribes of Warm Springs of Oregon (CTWS) have been contacted during the life of the project (FEIS, pages 408). The project area does lie within ceded lands of the CTWS and members of the Sisters Ranger District met with their Cultural and Heritage Committee to discuss this project (FEIS, pages 29 and 198) and a follow-up meeting was held in January 2003 to discuss the FEIS. The CTWS provided comments to the FEIS in a letter dated January 28, 2003. Specific comments received are addressed in this appendix. In addition, representatives from the Confederated Tribes of Warm Springs have served on both the PAC Metolius Working Group and the Stewardship Contracting Multi-Party Monitoring Team. Finally, there have been a variety of field trips to the project area which representatives of the tribes have participated on. The decision has been guided by the federal government's treaty and trust responsibilities to the Confederated Tribes of Warm Springs (ROD).

C. Agency Letters



United States Department of the Interior

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February 14, 2003

Kris Martinson, Project Leader
Sisters Ranger District
Deschutes National Forest
U.S. Forest Service
P.O. Box 249
Sisters, Oregon 97759

Subject: Comments on the Metolius Basin Forest Management Project Draft
Environmental Impact Statement [log#: 1-7-03-TA-210]

Dear Ms. Martinson:

The U.S. Fish and Wildlife Service (Service) received the Sisters Ranger District, Deschutes National Forest (Forest) Draft Environmental Impact Statement (DEIS) for the Metolius Basin Forest Management Project on December 17, 2002. This DEIS analyzes the effects of proposed fuel reduction and forest health management activities within the Metolius Basin on the Sisters Ranger District in Central Oregon. We are providing the following comments and recommendations to assist the Forest in completing this analysis.

The Service recognizes and appreciates the efforts made by the Forest in providing a collaborative approach to develop and analyze the proposed actions of the Metolius Basin Forest Management Project. Service staff have had early involvement on this project through the Deschutes Provincial Advisory Committee. Some of these comments will reiterate issues expressed at earlier meetings.

The proposed project consists of fuel reduction and forest health management activities in order to meet the goals of reducing the risk of catastrophic wildfire, and insect or disease events in the project area. Proposed actions include thinning dense forest stands, burning surface fuels, mowing dense shrubs, and closing roads, on approximately 12,600 acres on National Forest lands. The DEIS describes and analyzes five alternatives including the No Action Alternative. The four action alternatives, as described in the DEIS consist of different types of vegetation and fuel treatments on many of the same forested stands, proposed acreage to be treated ranges from 7,563 to 8,256 acres between the alternatives. Alternative 2 would partially reduce risk of catastrophic wildfire and insect and disease events while minimizing short-term watershed and

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2

resource effects by thinning trees less than 12 inches in diameter. Alternatives 3 and 4 are very similar, with the only difference being the upper size limit of trees to be removed. Alternative 3 effectively reduces risk of catastrophic wildfire and insect and disease events, and limits the thinning to trees less than 16 inches in diameter to minimize modification of late-successional habitat. Alternative 4 proposes to thin trees less than 21 inches in diameter while managing for late-successional habitat that is represented more by fire-climax ponderosa pine. Alternative 5 maximizes risk reduction across the landscape with an emphasis on restoring health in stands with higher mortality or higher levels of insects and disease.

The DEIS analyzes impacts to listed threatened and candidate species, including bull trout (*Salvelinus confluentus*), bald eagle (*Haliaeetus leucocephalus*), northern spotted owl (*Strix occidentalis caurina*), and spotted frog (*Rana pretiosa*). The entire project area is within a Late-Successional Reserve and encompasses a portion of the Metolius Basin Wild and Scenic River. Late-Successional Reserves were established under the Northwest Forest Plan to protect and enhance conditions of old-growth forest ecosystems, which serve as habitat for old-growth related species, including the northern spotted owl. According to the DEIS, the Metolius Late-Successional Reserve boundaries were designated primarily based on the presence of nesting spotted owl pairs during analysis for the Northwest Forest Plan. Based on impacts resulting from the proposed action we anticipate that consultation under Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1536 *et seq.*), as amended (Act) will be necessary. The Service is providing input and recommendations for the proposed project to facilitate an effective consultation on listed-species.

General Comments

The Service recognizes the need to reduce risk of catastrophic wildfire, establish and maintain defensible space corridors, promote the development of future large trees, and manage for old-growth ponderosa pine dependent species within the Metolius Basin. We support your stated goal to promote and accelerate the development of northern spotted owl habitat by reducing the risk of losing well-established old-growth mixed-conifer stands to insects, disease and wildfire. The Service believes that these objectives are best achieved by Alternative 3 with modifications to address additional protections for the northern spotted owl. The thinning proposed by Alternative 3 would reduce ladder fuels and crown density in 92 percent of the acres being treated, thereby changing the fire severity to low fire (non-lethal) or a mixed severity (30-80 percent mortality) ratings. Alternative 3 proposes thinning trees up to 16 inches in diameter on 4,936 acres. In stands exhibiting old-growth characteristics, this treatment will have a limited effect on crown density and can indirectly benefit the remaining large trees by reducing competition for nutrients and water. The active management of the Metolius Late-Successional Reserve provided by Alternative 3, reduces the risk of wildfire while promoting to the maximum extent possible the character and sustainability of old-growth habitat.

Additionally, the Service recognizes the need to promote early seral species (e.g., ponderosa pine and western larch) by occasionally removing larger white fir greater than 21 inches in diameter where stands exhibit high mortality or high levels of insect and disease. Despite the loss of some

spotted owl dispersal habitat, the Service supports the larch restoration component of Alternative 5. However, the Service will need to evaluate these proposed activities on a case by case basis with respect to the habitat needs of the northern spotted owl. Of particular concern to the Service will be maintaining important dispersal areas between owl clusters east-west and north-south.

Although we are in favor of the larch restoration component of Alternative 5, the Service is concerned about project impacts to habitat of the northern spotted owl. According to the DEIS, the proposed project will result in the effective loss of 170 acres of suitable habitat for the northern spotted owls, and 4,937 acres of owl dispersal habitat. Our concern for the loss of northern spotted owl habitat is emphasized by the fact that the habitat currently occupied by northern spotted owls in the project area is considered poor and minimally suitable. Although it is typical for the northern spotted owl to occupy habitats within eastside forests uncharacteristic of the classic definition of their habitat, it is the responsibility of the Forest to manage for the structural characteristics of stands necessary for all habitat requirements, including dispersal.

The Service recognizes that not all identified northern spotted owl suitable habitat is sustainable over the long-term. The DEIS does not differentiate between suitable habitat that is sustainable and suitable habitat that is not likely to be sustainable for northern spotted owl when determining acres of suitable habitat loss as a result of implementing the various project alternatives. Where sustainable habitat (i.e., mixed conifer wet or mixed conifer dry on north aspects with $\geq 20\%$ slope) exists within the proposed project area, we feel that these areas should be managed for the northern spotted owl, except where these areas occur within the proposed defensible space. The DEIS states that the 170 acres of suitable habitat to be treated is within the defensible space corridors and within aspen stands. However, Table 22 in the Biological Evaluation depicts other treatments.

The development of suitable habitat for northern spotted owls should be emphasized in the proposed action and should be clearly articulated. In reviewing the DEIS, we have summarized the goals of the proposed actions and provided recommended modifications to Alternative 3 to minimize, avoid or eliminate potentially significant impacts to the northern spotted owl. The goals provided by the DEIS and summarized by the Service are as follows:

- Promote and accelerate the development of northern spotted owl habitat by reducing the risk of losing well-established old-growth mix-conifer stands to insects, disease and wildfire.
- Protect and enhance over the short (i.e., less than 60 years) and long-term the character of old-growth forest ecosystems, which serve as habitat or potential habitat for old-growth related species, including the northern spotted owl.
- Within the Metolius Late-Successional Reserves reduce the risk of high severity (stand replacement) fires with treatments that limit the effect on crown density.

The Service proposes the following list of modifications to Alternative 3:

- In appropriate habitat types, designate and maintain, over the short and long-term, connectivity corridors suitable for northern spotted owl dispersal.
- Maintain all white fir and Douglas fir trees greater than 14 inches in diameter that provide a mid to upper canopy within all stands within the northern spotted owl connectivity corridors to allow for improved northern spotted owl dispersal conditions through moist and dry ponderosa pine stands designated within the corridors.
- Where the opportunity exists, accelerate recovery of late-successional old-growth characteristics in mixed conifer, ponderosa pine, and western larch stands exhibiting high mortality or high levels of insect and disease.
- Where moist mixed conifer or dry mixed conifer on north aspects have been identified as suitable habitat for northern spotted owl, manage these areas for northern spotted owl, unless fire hazard is imminent within the defensible space.

Specific Comments

Page 80 (Table 2-4): Alternative 2-5 proposes thinning trees 12 inches in diameter or less within northern spotted owl suitable habitat within the defensible space. Page 213, last paragraph, describes the thinning diameter limit to be 8 inches in diameter. The Biological Evaluation of Threatened, Endangered, and Sensitive Wildlife Report listed small tree thinning to be less than 8 inches in diameter, except in plantations and naturally regenerated stands where the limit was 12 inches in diameter. On page 228, third paragraph, thinning within the defensible space corridors would only include trees less than 8 inches in diameter. On page 245, Table 4-7, lists the thinning diameter as 12 inches in diameter. In summary, please clarify the diameter limits that are actually being proposed under the action alternatives.

Page 127: The definition of "activity center" is provided. However, on page 239, the words "activity area" are used. Please define "activity area" if appropriate.

Page 243: First paragraph under the category "Connectivity". Describing the effect of the alternatives to northern spotted owl connectivity and the connectivity corridor it states that: "...the majority of these stands are located in the ponderosa pine plant association which is not able to sustain dense canopy conditions over the long-term, and project goals do not intend maintaining these stands as spotted owl dispersal." To avoid or eliminate potentially significant impacts to the northern spotted owl, the connectivity corridor should be designated and maintained over the long-term. If this is not a mis-statement, further clarification will be necessary to evaluate the effects of the fore mentioned project goal.

Conclusion

The Service recognizes the importance and complexity of reducing the risk of catastrophic wildfires, while managing for Late Successional Reserve species. We believe that these objectives are best achieved by Alternative 3 with modifications as recommended in this letter to address additional protections for the northern spotted owl. We appreciate the opportunity to provide comment prior to the initiation of formal consultation. We look forward to working with you in finalizing the DEIS. If you would like to schedule a meeting, need any additional information, or have questions or comments, please contact me, Jerry Cordova, or Jennifer O'Reilly at (541) 383-7146.

Sincerely,



Nancy Gilbert
Field Supervisor



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

February 15, 2003

Reply To
Attn Of: ECO-088

Ref: 02-005-AFS

Kris Martinson, Project Leader
Sisters Ranger District
Deschutes National Forest
PO Box 249
Sisters, OR 97759

Dear Ms. Martinson:

The U. S. Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed **Metolius Basin Forest Management Project** (Project) pursuant to Section 309 of the Clean Air Act and section 102(2)(c) of the National Environmental Policy Act (NEPA) as amended. Section 309, independent of NEPA, directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions as well as the adequacy of information in the NEPA document.

The DEIS proposes to implement fuel reduction and forest health management activities to reduce the potential risk of catastrophic wildfire or damaging impacts from insects or diseases. Project area covers approximately 12,600 acres of the Metolius River headwater region within the Deschutes National Forest. Proposed Project actions include thinning dense forest stands, burning surface fuels, and decommissioning miles of roads. There are five Alternatives for the proposed project and the No Action Alternative. Alternative 4 is the Proposed Alternative. Alternative 4 proposes silvicultural practices across 74% of the project area, a 21 inch diameter size limit on trees that can be removed, and the closure of 50 road miles.

EPA's main concerns with this DEIS are related to aquatic resources, endangered and threatened species, silvicultural practices, dispersed recreation, tribal consultation, and indirect and cumulative effects.

EPA, however, supports combining the objectives contained in 4 Alternative with Alternative 5's proposed actions related to larch restoration because it:

- will adequately address a balanced wildfire risk reduction across the landscape and
- promote habitat diversity through encouraging forest compositional diversity.


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160

Based on our review, we have rated the DEIS, EC-2 (Environmental Concerns - Insufficient Information). This rating and a summary of our comments will be published in the *Federal Register*. A summary of the rating system we used in our evaluation of this DEIS is enclosed for your reference.

Enclosed please find our detailed comments, which elaborate further on these issues. I encourage you to contact Tom Connor of my staff at (206) 553-4423 to discuss our comments and how they might best be addressed. Thank you for the opportunity to review this Draft EIS.

Sincerely,


Judith Leckrone Lee, Manager
Geographic Unit

Enclosures

cc: Dan Opalski
Christine Kelly

**EPA'S DETAILED COMMENTS ON THE
METOLIUS BASIN FOREST MANAGEMENT PROJECT
DESCHUTES NATIONAL FOREST (DNF)
DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)**

Aquatic Issues -

1) The Final Environmental Impact Statement (FEIS) should discuss how implementation of proposed Defensible Space Corridors (DSC) around private lands and access roads, wherein existing fuel loads would be reduced, could cause further impacts to Clean Water Act 303(d) listed waters in the project area.

a) According to Figure 3 in the EIS Summary, DSC would criss-cross the Metolius River and associated tributaries. The DEIS proposes constructing DSC buffer zones along access roads where focused fuel reduction silvicultural practices would potentially reduce wildfire risk around private parcel lands and along evacuation routes. The DSC strategy for access roads would be a band on either side of approximately 600 feet wide for reduced fuel load concentrations. For private lands, the DSC strategy is to create a band 1200 feet wide along outside perimeters.

The two 303(d) listed waterbodies in the project area are the North and the South Forks of Lake Creek. The listed water quality impaired parameter is high in-stream water temperatures. Past monitoring has detected that warmed surface waters are being discharged from Suttle Lake into Lake Creek. Suttle Lake lies just to the west of the project area borders. As Lake Creek flows from Suttle Lake, it divides forming large braided channels due to the low topography relief of the Upper Metolius basin that exists between Suttle Lake and Metolius River. The braided channel network and low relief can negatively affect stream temperatures unless the riparian corridor is well vegetated and well stocked with shade casting trees.

b) In addition, the FEIS should describe how DSC strategies of thinning trees of diameter of 8" or less would be effective in areas that already are experiencing lowered basal area, especially if any exist along riparian areas.

2) FEIS should discuss how it will meet the objectives of the Aquatic Conservation Strategy of the Northwest Forest Plan, especially Objective #4, within DSC areas that cross streams and rivers.

a) Objective #4 states: "Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and mitigation of individuals composing aquatic and riparian communities."

As mitigation for the Pelton Round Butte Dams on the lower Metolius, the upper Metolius is designated essential fish habitat (EFH) for chinook. References to this mitigation were not adequately presented in the DEIS and should be included the FEIS.

3) EPA would like to see *U.S. Forest Service (USFS) and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* disclosed more fully within the FEIS.

a) The USFS has a role in developing and implementing Total Maximum Daily Loads (TMDL) for impaired waterbodies on their land. This *303(d) Protocol* provides interim direction to the USFS (and the BLM) on how to address waterbodies which have been listed pursuant to § 303(d) of the CWA that are on USFS (and BLM) lands while Oregon develops their TMDL allocation plans. The *303(d) Protocol* directs the USFS to.

(1.) validate that listed streams are impaired;

(2.) demonstrate that sufficiently stringent management measures are in place to prevent additional degradation; and

(3.) to proactively develop Water Quality Restoration Plans (WQRP) and not wait for the development of a TMDL.

Endangered Species

1) We suggest that the FEIS discuss the current level of knowledge and location of critical habitat designations for Bull trout, a listed threatened species under the Endangered Species Act (ESA).

a) Populations of bull trout are found within the project area. Unlike other regions where the threatened bull trout lives, the upper Metolius populations are increasing (DEIS, page 152). Both the upper Metolius River and an important headwaters tributary, Jack Creek, provide spawning and rearing habitat for this federally listed species. Since the DEIS states (page 152) that critical habitat will be designated by 2003, we suggest that information on designated critical habitat be included in the FEIS to support recovery efforts.

2) We recommend that the FEIS include a Table, like Table 3-5 (page 126), that would cite all ESA or sensitive species that live within the project area. Table 3-5 was created for ESA or sensitive species, yet there is not a similar concise table for project area fish.

Wildlife corridors -

1) The FEIS should disclose if the proposed actions to establish wildlife corridors to assist in the dispersal of ESA listed species (i.e., the spotted owl) is consistent with the Northwest Forest Plan to support viable populations.

a) The Figure 3-8 (page 130) illustrates a connectivity corridor for spotted owl dispersal. Corridors appear to be relatively straight for long distances. Does best available science conclude that owls will successfully disperse along straight linear corridors?

b) The FEIS should include relevant cartographic information showing where and these corridors are connected to outside of the project area.

Silvicultural practices -

1) The FEIS should discuss canopy closure percentages that exist now and are proposed for the future. The EIS should articulate if prescriptions include canopy reduction goals and a strategy to achieve these goals in compliance with the intent and direction of the Northwest Forest Plans, the Project's Desired Future Conditions, and habitat support for ESA listed species.

2) We are concerned over the proposed silvicultural prescription: "Where healthy stand conditions or sensitive resources would not need or benefit from thinning, then 8" diameter [trees] or less would be removed within the DSC..." (EIS Summary, page 11).

a) This silvicultural prescription does not appear to adequately address potential negative impacts to sensitive aquatic resources, like 303(d) listed waterbodies, where proposed thinning within riparian areas could negatively affect beneficial shading and potentially could exacerbate restoration activities.

b) The intent of this proposed practice, due to its wording, would lead a reviewer to consider that thinning would proceed even if thinning would not benefit the resource. Please clarify.

Dispersed Recreation -

1) The FEIS should discuss how existing and future recreational goals will be met, and their impacts to riparian integrity, soil health, or disruption of sensitive or ESA wildlife populations.

a) The Metolius basin is already heavily used by dispersed recreationalists. "Heavy recreation use has been impacting soils and vegetation" (DEIS page 176).

b) Without adequate waterfowl loafing areas in the upper Metolius riparian corridor, heavy recreational usage of the riparian areas may deter and/or impede usage by Harlequin ducks, a listed USFS designated sensitive species.

2) The FEIS should discuss USFS's strategy for properly enforcing road closures against unauthorized entry.

a) Action Alternatives will decommission miles of road. Yet the DEIS has stated that existing "inactivated (closed) roads ...have been breached or [forcibly been] re-opened by

the public.” (page 180). While we strongly support decommissioning of roads to reduce overall road densities, as more road are proposed for decommissioning, how will the USFS exercise increase vigilance and enforcement of unauthorized entry.

Tribal consultation -

1) The FEIS should disclose how the Deschutes National Forest has consulted and coordinated with Tribe(s) in development of the EIS as required by the Executive Order 13175.

a) While the DEIS states that the Metolius Basin is highly valued by Confederated Tribes of Warm Springs and is protected by treaty rights (page 12), the DEIS has not directly presented adequate consultation and coordination planning efforts with effected Tribes(s).

Paraphrasing EPA Region 10's Tribal Consultation Process, “Consultation” means the process of seeking, discussing, and considering the views of federally recognized tribal governments at the earliest time in the decision-making process. Consultation generally means more than simply providing information about what the agency is planning to do and allowing comment. Rather, consultation means two-way communication that works toward a consensus reflecting the concerns of the affected federally recognized tribe(s).

Indirect and Cumulative effects -

1) The FEIS should adequately disclose indirect and cumulative impacts to the Project’s impaired waterbodies from both inside and outside sources.

a) For example, while Suttle Lake is outside of the project area, temperature elevated surface waters from this resource are being discharged into the Lake Creek system which does contain 303(d) listed impaired tributaries. The FEIS should discuss strategies to restore listed waterbodies from further impairment.

Cartographic information -

1) The FEIS should include improved cartographic information of the lands surrounding the project area.

a) Currently most of the cartographic information on the proposed project is based on the base map used to identify project issues (i.e., Figures 2-4, 2-5, and 2-6). While this practice does provide focused attention to the project border and its internal elements, the reviewer lacks the information to understand areas even immediately outside of the project area that may impact conditions and processes within the project area. We strongly recommend that the FEIS adequately extend the viewable regions surrounding the project area to include such relevant geographic forms as Suttle Lake or referenced

land management areas as Metolius Heritage Area or the Metolius Research Natural Area.

b) Also, the FEIS should include a base map, similar to Figure 3-10 (page 173), showing all streams and rivers in the project area, their names, and place the map in the fisheries section. As the document stands, it is not clear where "Upper Metolius," Heising Spring, or Black Butte is located. For the benefit of the reviewer, the FEIS should cartographically show where the Metolius Wild and Scenic River begins and ends and the location of the Pelton Round Butte Dams. Furthermore, Figure 3-11 (page 177) does not adequately show waterbody locations since not all project elements are identified, and this Figure is positioned too late in the document and it functions best to highlight riparian corridors in the project area.



Oregon

Theodore R. Kulongoski, Governor

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February 14, 2003

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RE: Metolius Basin Draft EIS

The Oregon Department of Fish and Wildlife (ODFW) reviewed the Draft Environmental Impact Statement for the Metolius Basin Forest Management Project. The Sisters Ranger District (SRD) proposes to reduce wildfire risk; improve forest health; protect safety of people, property, and tribal and natural resources; restore late-successional forests, and protect and restore watershed conditions. Primary actions focus on reducing forest density, reducing fuel loads, and reducing sediment into streams. Proposed methods include thinning from below, underburning, mowing, and road closures.

The ODFW appreciates the amount of work the SRD staff invested to facilitate public discussion about management in the project area. From the numerous discussions conducted by the SRD with a diverse public, key issues were identified from which alternatives were developed. Following are our comments regarding proposed actions:

THINNING FROM BELOW

White-headed Woodpecker – Focal Species for the Ponderosa Pine Late Successional Habitat Type (EIS – 24, 26, 279).

A brief review of the current literature on habitat requirements for the white-headed woodpecker and other down and dead wood dependent wildlife¹ suggests that EIS snag management recommendations (EIS – 61) are inadequate for conservation of the white-headed woodpecker. The literature recommends higher levels of snags both in the smaller size classes (10" dbh) and the larger size classes (20"> dbh)^{2/3/4} than the EIS calls for (EIS – 61). We recommend creating suggested levels and distribution of snags² out of the trees scheduled to be thinned. We base our recommendation on the following rationale:

1. Frenzel (2001)⁵ found adult mortality to be higher than recruitment of young when studying nesting success and turnover-rates of white-headed woodpeckers, of which some of the data came from within the project area.
2. The EIS suggests there are inadequate snag sizes and numbers to meet white-headed woodpecker habitat requirements, let alone to meet cumulative cavity nester habitat requirements (EIS – 147, 262, 282, 283). Increased snag numbers could increase cavity dependent wildlife, which could provide more wildlife viewing opportunities.

¹ DecAID, the *Decayed Wood Advisor* for Managing Snags, Partially Dead Trees, and Down Wood for Biodiversity in Forests of Washington and Oregon (http://www.fs.fed.us/wildecology/decaid/decaid_background/decaid_home.htm)

² Summary Narrative: Advice on Decayed Wood in the Ponderosa Pine/Douglas-fir Forest, Larger Trees Vegetation Condition <http://domino.thisinc.com/dev/usforest/shashi/decaidshashi.nsf/LevelOneDisplay/5C2E0EE7FFE639EE88256BAC006C309A?OpenDocument>

³ Bull, Evelyn L., Catherine G. Parks, and Torolf R. Torgersen. 1997. Trees and logs important to wildlife in the interior Columbia River Basin. USDA Forest Service, PNW Research Station, Portland, OR. PNW-GTR-391. Pg 30

⁴ USDA, USDI, 1997, Interior Columbia Basin Ecosystem Management Project, Eastside Draft Environmental Impact Statement, Volume 1, pp. 4-151/152

⁵ Frenzel, Richard W. 2001. Nest-sites, nesting success, and turnover-rates of white-headed woodpeckers on the Deschutes and Winema National Forests, Oregon in 1999. Oreg. Nat. Heritage Prgm., Portland, OR. Unpubl. Rpt. 33 pp. plus tables and figures.

129

3. The ODFW listed the white-headed woodpecker as Sensitive Critical due to loss of late and old structure ponderosa pine tree structure and loss of large snags.⁶ The EIS confirms loss of this habitat in the project area (EIS – 282).
4. The proposed acres of thinning (worker safety) and underburning (Alt. 3 & 4, 74% or 12,648 acres of the total project area would be treated – EIS – 52) will make it difficult to retain existing snags and maintain white-headed woodpecker foraging habitat associated with big game cover patches (EIS – 63).
5. Down wood is also deficient in the project area (EIS – 147/148) which can partially be offset through snag creation for whiter-headed woodpeckers and other snag dependent wildlife.

The ODFW does not want to imply that the SRD is *not* doing anything to conserve the white-headed woodpecker. Instead we want to recognize the SRD for proposing treatments that open the forest canopy, reduce forest stand density, and reduce shrub cover within 300' of existing and proposed white-headed woodpecker nest sites. Further, reducing road densities (34%+ Alt. 3 & 4) will reduce loss of snags from woodcutting. Research suggests that these actions can reduce predation on young and adults; can reduce loss of habitat from stand replacement fires, insects and disease; and can sustain large tree structure and snag recruitment over the long-term.

Riparian Reserves

The action alternatives call for treating 2380 acres in designated riparian reserves (EIS – 83). It is not clear to the ODFW how proposed vegetation actions in the riparian reserves, except for meadow and aspen restoration, will be beneficial to the riparian reserve and protect water quality in both the short and long term. We recommend implementing road closures, reducing stream crossings, restoring the meadow and aspen areas, and treating areas identified as wildfire defensible space. We also recommend dropping the other proposed vegetation treatments in the riparian reserves unless benefits to riparian reserve values can be clearly shown in the short and long term. Further, in those areas the SRD can clearly show benefits through treatments, consideration should be given to treating them two to three years after the uplands have been treated to act as sediment traps for any overland flow from upland thinning or potential nutrient inputs from prescribed fire. We base our recommendations on the following rationale:

1. Detrimental Impacts from all proposed management actions *"may range from increased water temperatures and sedimentation, decreased dissolved oxygen levels, decreased riparian function and productivity, and changes to stream pattern, profile, dimension, and flow dynamics. Beneficial effects may include increased riparian function and productivity, increased shading vegetation over the long term, and less probability of water quality degradation due to loss of vegetation from catastrophic wildfire, insect, or disease."* (EIS – 309). Reviewing the rationale for the action alternatives, it appears that much of the justification for treatments is to reduce wildfire fire risk in riparian reserves through fuel reduction (EIS – 316-322). However, by treating fuel loads in the uplands, the wildfire risk to the riparian reserves should be reduced significantly, thereby reducing the need to treat fuel loads in designated reserves.
2. One justification for thinning in the riparian reserves was to move slow-growing trees in the riparian reserve to larger sizes quicker (EIS – 321). However, the plan points out that *"the action alternatives would move some stands toward large tree character slightly faster than the no action alternative"* (EIS – 322). Justification for removing trees in the 12 to 21+ inch size classes in the riparian reserves appears to be weak, especially if the action would lead to increased sedimentation, loss of shade, or loss of potential instream woody material.
3. Deferring beneficial vegetation management actions in riparian reserves for one to three years after adjacent upland actions may reduce instream sedimentation from thinning and nutrient influx from prescribed fires. Retaining the vegetative integrity of the riparian reserve as a filter until treatments in adjacent upland units settle could be beneficial. The EIS states that *"Much of the sediment production from thinning occurs within the first year, and decreases sharply in the next 2 to 3 years"* (EIS – 320).

Rx FIRE/MOWING

Biological Mule Deer Winter Range – Identified in the Integrated Natural Fuels Management Strategy (1998) and the Metolius Mule Deer Winter Range Plan (1994).

⁶ Marshall, David B. et.al., 1992, Sensitive Vertebrates of Oregon, Oregon Department of Fish and Wildlife.

The ODFW is concerned that more mowing and prescribed fire will occur in mule deer winter range than is necessary to protect the area from stand replacing wildfires (EIS – 234). We recommend limiting the proposed surface fuel treatments to the:

- Defensible space corridors,
- Non-bitterbrush producing areas,
- Bitterbrush producing areas with low forest crowns (i.e., pole and smaller),
- Bitterbrush producing areas that have low bitterbrush shrub cover (10%<) due to high forest canopy cover and a deep duff layer, and
- White-headed woodpecker snag clumps managed for nesting.

We base our recommendations on the following rationale:

1. Over 11,000 acres are proposed to be thinned to reduce crown densities and ladder fuels (EIS – 233). Through the process of thinning the forest, the understory shrubs will automatically get crushed, thereby reducing needle drape and bitterbrush height and vigor. Mowing or burning may not be necessary for 10-years which should also cut down on smoke concerns in the Metolius Basin if treatment can be deferred.
2. The EIS states (EIS – 265) that Omi and Martinson (2002) showed *"that in terms of reducing wildfire severity, increases in the shrub component of surface fuels have been more than compensated for by reductions in crown bulk density in heavier thinning treatments."*
3. The project area already contains predominately early and mid seral bitterbrush (EIS – 265). According to Bend Fort Rock fire staff working on their own fuel reduction projects, early seral conditions constitute low surface fuel fire risk, while mid-seral bitterbrush is moderate unless there is high needle drape and high shrub canopy cover. Bitterbrush treatment protocol in mule deer winter range on the Bend Fort Rock is to create a mosaic of shrub seral conditions where 1/3 is in an early seral condition, 1/3 in mid, and 1/3 in late. Significant reductions in stand replacing wildfire risk can be achieved using this formula while retaining maximum forage for wintering mule deer.
4. The less acres that are necessary to underburn (EIS – 234), the easier it will be to retain identified big game cover clumps, which could also serve as foraging habitat by white-headed woodpeckers and flammulated owls, or as nesting sites by Goshawks, Coopers or Sharp-shinned hawks.

White-headed woodpecker (as noted above)

The proposed acres of thinning (worker safety) and underburning (Alt. 3 & 4, 74% or 12,648 acres of the total project area would be treated – EIS – 52) will make it difficult to retain existing snags and to maintain white-headed woodpeckers foraging habitat associated with big game cover patches (EIS – 63).

Wildlife Species Associated with Down Wood

Down wood is already deficient on the project area (EIS – 147/148). The less acres necessary to underburn (EIS – 234) the easier it will be to retain existing down wood.

ROADS

The ODFW is concerned that more miles of open roads are being retained than are necessary for forest management or recreational opportunity. We recommend reducing road densities to Forest Plan guidelines in all treatment units where fire risk reduction and stand density level objectives are met. It is important to provide justification for areas that exceed Forest Plan road density guidelines when forest and fuel objectives are met. We base our recommendations on the following rationale:

White-Headed Woodpecker

Retaining road densities higher (3.6 miles/ square mile) than recommended in the Forest Plan (1.5 m/sq m Metolius Heritage Area and 2.5 m/sq m elsewhere – EIS – 180) will increase the difficulty to retain desired snag levels due to woodcutting.

Big Game – Deer and Elk

Research shows that an open secondary road density of 3.6 miles per square mile reduces habitat effectiveness for summering elk by 60% and 42% for summering deer⁷. This impact can be expected to be even greater on winter range as in the Metolius Basin, especially since existing thermal and hiding cover will be significantly reduced through implementation of any of the action alternatives

Given the limitations on staff, time and funding, the ODFW wants to recognize the SRD for prioritizing road closures to be implemented first in riparian areas, in First and Suttle subwatersheds, and in deer winter range.

SUMMARY

Many actions are being proposed to protect existing wildlife habitat conditions from stand replacing wildfire, insects, and disease. Through these actions desired habitat conditions for one species are being converted into desired habitat conditions for another species such as existing hiding cover and forage for mule deer being converted into open stands of large trees with little understory brush for nesting white-headed woodpeckers. For the most part this is necessary to meet the full range of objectives identified in the Metolius Basin. However, we also believe there are additional actions the SRD can take to enhance white-headed woodpecker habitat, maintain forage for wintering mule deer, and reduce wildlife habitat fragmentation, which we have specified in our comments. There are also proposed actions in riparian reserves to protect them from wildfire. However, it is not clear what the wildfire risk would be once the uplands were treated. Other actions in the riparian reserves to treat stand density in the 12" to 21" size category are proposed with what appears to be of little benefit towards the creation of large tree structure quicker than through no action. The recommendations we offered were meant to provide a modification to proposed action for the benefit of fish and wildlife populations dependent on existing and potential habitats. Our intent was not to second guess SRD resource specialists, instead we provided our perspective based on our review of proposed actions in the draft plan.

Overall, we have appreciated the opportunity to participate in the planning process. Sitting at the table with resource specialists along with the public, represented by a wide array of interests, has helped us appreciate the amount of effort that is necessary to address the ecological, social, and economic variables during any planning process. I hope our comments are useful and we look forward to working with the SRD staff during the next phase of this plan.

Sincerely,

Glen Ardt
Wildlife Habitat Biologist

⁷ Thomas, Jack W., et. al. 1979, Wildlife Habitats in Managed Forests the Blue Mountains of Oregon and Washington, USDA Agricultural Handbook No. 553 pp 512, reference pg. 122

THE CONFEDERATED TRIBES OF THE WARM SPRINGS RESERVATION OF OREGON



Warm Springs, Oregon 97761 / 541 553-1161

Leslie Weldon
Deschutes National Forest
1645 Highway 20 E
Bend, Oregon 97701

January 28, 2003

Dear Leslie:

The Confederated Tribes of Warm Springs Reservation of Oregon (CTWSRO) has received and reviewed a copy of the draft Environmental Impact Statement for the Metolius Basin Forest Management Plan. Members of our Natural Resource team as well as Warm Springs Forest Product Industries are also involved in the planning process for this project.

As you may know, the CTWSRO has a direct interest in the proposed management activities on the Deschutes National Forest as this is within the area of the CTWS ceded lands. The boundaries of ceded lands for the CTWSRO were defined in the treaty of 1855 and encompass approximately ten million acres from Cascade Locks on the Columbia River, south to Bend, east to the Blue Mountains including the John Day basin, and north to the Columbia River. The Tribes have co-management authority over the fish, wildlife, and water quality, along with the state of Oregon, within the area of these ceded lands. In addition, this project is important for CTWSRO because of the proximity of tribal and public land boundaries along the Metolius River and the subsequent shared resources within this basin.

CTWSRO, in general, commends the Deschutes National Forest for the innovation in design and resource management within this proposed forest demonstration project. It will potentially serve as a template for future forest resource extraction and management activities. The goals of this project are to reduce fuel loading and to encourage forest health, with related timber harvest and under burning as prescriptive treatments within this process.

The CTWSRO supports a combination of Alternatives 4 and 5 within the draft EIS. The following components of Alternative 4 should be included in the decision:

Tree size: removal of trees in the following categories: Up to 21" for ponderosa pine, Douglas-fir, and western larch. 25" for white fir

168

Riparian Reserve: thinning of trees up to 16" diameter, with thinning by hand for 8" or less

Roads: closure (inactivation and decommissioning) of 50 road miles

The following components of Alternative 5 should be included in the decision:

Defensible space: removal of trees up to 21" diameter

Larch restoration: small group openings and thinning in stands so that the existing larch component can be restored (795 acres)

Shelterwood: removing dead and declining trees in stands affected by root disease, dwarf mistletoe and spruce budworm (172 acres of shelterwood only)

The entire scope of this project on public lands occurs within a designated Late Successional Reserve under the Northwest Forest Plan. According to this plan, the east side of the Cascades may contain prescribed treatments as follows: "...management activities designed to reduce risk levels are encouraged in those Late-Successional Reserves even if a portion of the activities must take place in currently late-successional habitat. While risk-reduction efforts should generally be focused on young stands, activities in older stands may be appropriate if: (1) the proposed management activities will clearly result in greater assurance of long-term maintenance of habitat, (2) the activities are clearly needed to reduce risks, and (3) the activities will not prevent the Late-Successional Reserves from playing an effective role in the objectives for which they were established. (Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, Attachment A).

We have supported the proposed diameter limits in this letter because of the habitat requirements of the Northern Spotted Owl. Larger diameter white fir (over 25"), although not historically present in high numbers within the ponderosa pine dominated old growth, currently provides structural and thermal benefits to this species, both in the nesting, roosting, and foraging areas and within connectivity corridors.

The CTWSRO also acknowledges that there are other species such as the White Headed Woodpecker and the Flamulated Owl that require old growth pine and fir habitat within this project area. Loss of this habitat due to fire suppression is changing typical conditions for these species, thus potentially affecting their feeding and foraging behaviors. This project will potentially help to recreate more historic conditions that are conducive to these species.

The CTWSRO also supports the riparian treatment within this project, as this will potentially have the benefit of improving riparian stands and avoiding a large stand replacement event within these vital corridors. The healthy population of bull trout

within the Metolius system is one that should be maintained. A functional riparian corridor is vital to this process.

With respect to cultural resources, CTWSRO has the following concerns with the draft EIS:

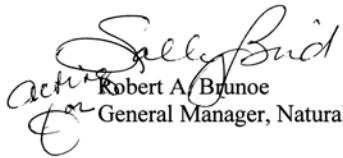
Chapter 2, pg. 72, under Heritage Resources--there should be clarification on whether Heritage Resource sites/areas are being considered as only inclusive of the site/area proper or whether an established buffer zone is also included.

Chapter 4, pg. 383, under Heritage Resources--paragraph 5—an environmental consequence may be the picking up of artifacts by those working on projects; however, there is no approach noted on how to deter project workers from doing this. We suggest providing workers education on the legal parameters and importance of cultural resources.

Cultural resource issues and concerns may be directed to Sally Bird at (541) 553-2006 or by e-mail at sbird@wstribes.org

The CTWSRO looks forward to continuing to work with the Deschutes National Forest in protecting Treaty natural resources.

Sincerely,


Robert A. Brunoe
General Manager, Natural Resources

Cc: Bill Anthony (USFS)
Kris Martinson (USFS)
Laurie Turner (USFS)
Terry Luther (CTWSRO)
Sally Bird (CTWSRO)